Computer Algebra
Independent Integration Tests

Summer 2023 edition with Rubi V 4.17.3

3-Logarithms/57-3.1.4-f-x-^m-d+e-x^r-^q-a+b-log-c-x^n-^p

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Contents

CHAPTER 1

Introduction

This report gives the result of running the computer algebra independent integration test.The download section in on the main webpage contains links to download the problems in plain text format used for all CAS systems. The number of integrals in this report is [456]. This is test number [57].

1.1 Listing of CAS systems tested

The following are the CAS systems tested:

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

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

Sympy was run directly in Python not via sagemath.

1.2 Results

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

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

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

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

System	% solved	% Failed
Rubi	100.00 (456)	0.00 (0)
Mathematica	98.46 (449)	1.54 (7)
Maple	73.03 (333)	26.97 (123)
Sympy	62.06 (283)	37.94 (173)
Fricas	61.40 (280)	38.60 (176)
Maxima	49.34 (225)	50.66 (231)
Giac	41.67 (190)	58.33 (266)
Mupad	32.02 (146)	67.98 (310)

Table 1.1: Percentage solved for each CAS

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

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

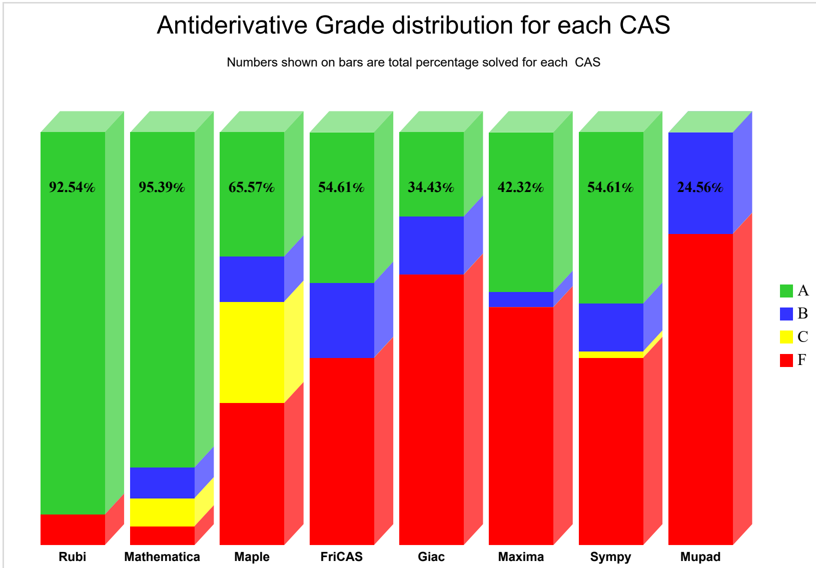
Table 1.2: Description of grading applied to integration result

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

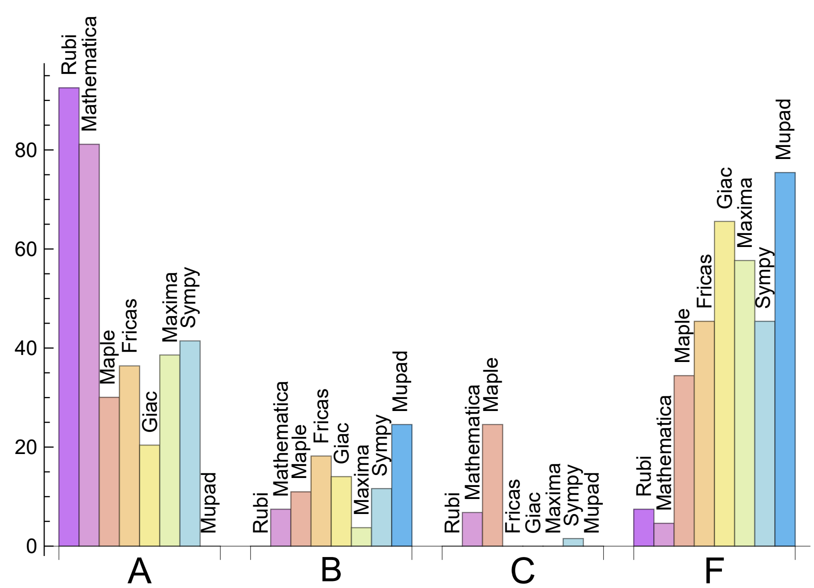
System	% A grade	% B grade	% C grade	% F grade
Rubi	91.667	0.219	0.658	7.456
Mathematica	81.140	7.456	6.798	4.605
Sympy	41.447	11.623	1.535	45.395
Maxima	38.596	3.728	0.000	57.675
Fricas	36.404	18.202	0.000	45.395
Maple	30.044	10.965	24.561	34.430
Giac	20.395	14.035	0.000	65.570
Mupad	0.000	24.561	0.000	75.439

Table 1.3: Antiderivative Grade distribution of each CAS

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



The figure below compares the grades of the CAS systems.



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

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

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

System	Number failed	Percentage normal failure	Percentage timeout failure	Percentage exception failure
Mathematica	7	100.00	0.00	0.00
Rubi	0	0.00	0.00	0.00
Maple	123	100.00	0.00	0.00
Fricas	176	92.61	0.00	7.39
Sympy	173	72.25	23.70	4.05
Maxima	231	56.28	0.43	43.29
Giac	266	99.62	0.00	0.38
Mupad	310	0.00	100.00	0.00

Table 1.4: Failure statistics for each CAS

1.3 Time and leaf size Performance

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

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

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

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

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

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

System	Mean time (sec)
Maxima	0.22
Fricas	0.31
Mathematica	0.34
Giac	0.35
Mupad	0.44
Rubi	0.46
Maple	2.47
Sympy	25.72

Table 1.5: Time performance for each CAS

System	Mean size	Normalized mean	Median size	Normalized median
Mupad	85.30	1.11	82.00	1.09
Maxima	123.27	1.47	109.00	1.19
Rubi	144.80	0.98	116.50	1.00
Mathematica	167.43	1.31	125.00	1.03
Giac	222.13	2.09	132.00	1.44
Fricas	266.51	2.18	159.00	1.74
Maple	344.15	2.50	177.00	1.71
Sympy	402.59	3.29	207.00	1.87

Table 1.6: Leaf size performance for each CAS

1.4 Performance based on number of rules Rubi used

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

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

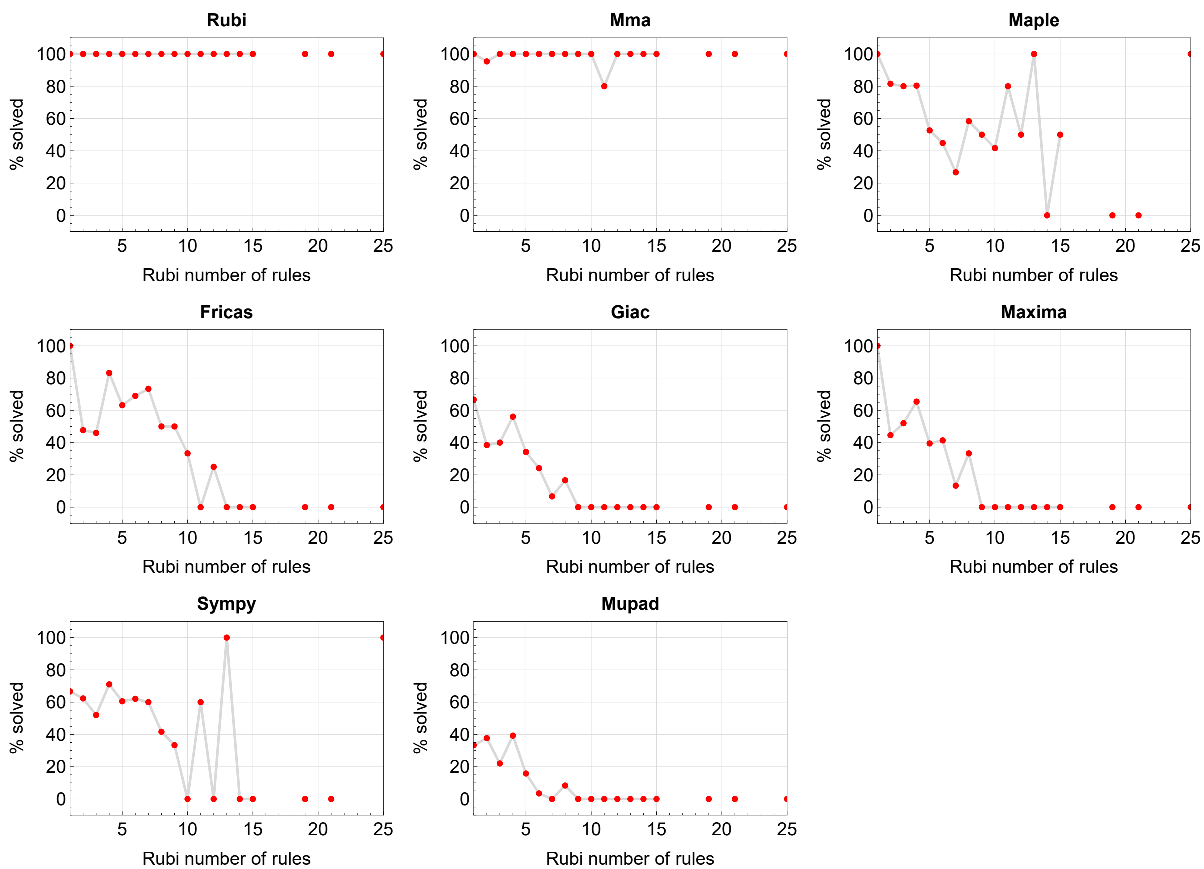


Figure 1.1: Solving statistics per number of Rubi rules used

1.5 Performance based on number of steps Rubi used

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

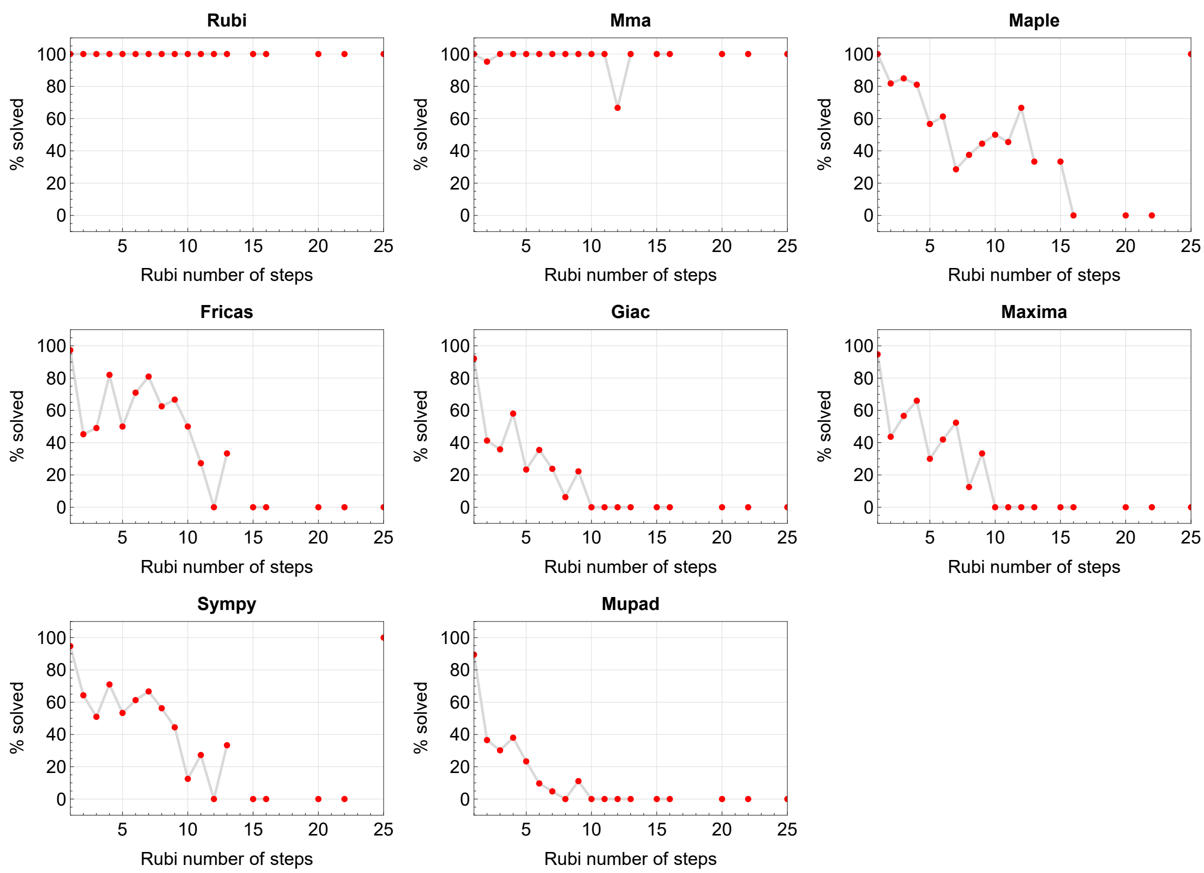


Figure 1.2: Solving statistics per number of Rubi steps used

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

1.6 Solved integrals histogram based on leaf size of result

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

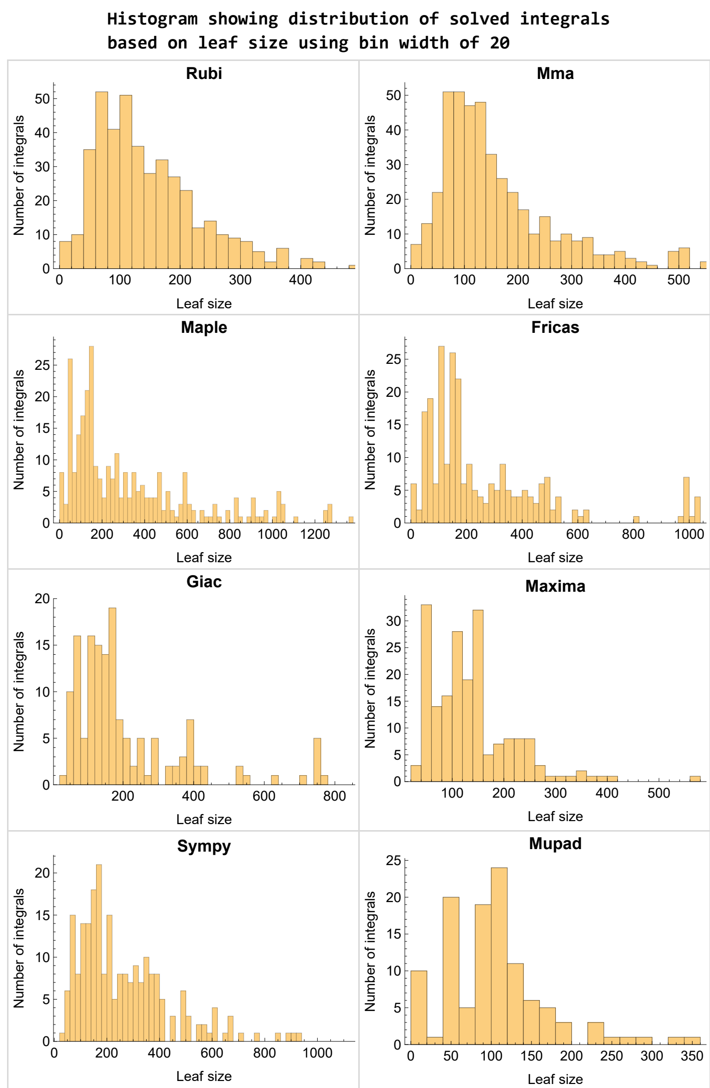


Figure 1.3: Solved integrals based on leaf size distribution

1.7 Solved integrals histogram based on CPU time used

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

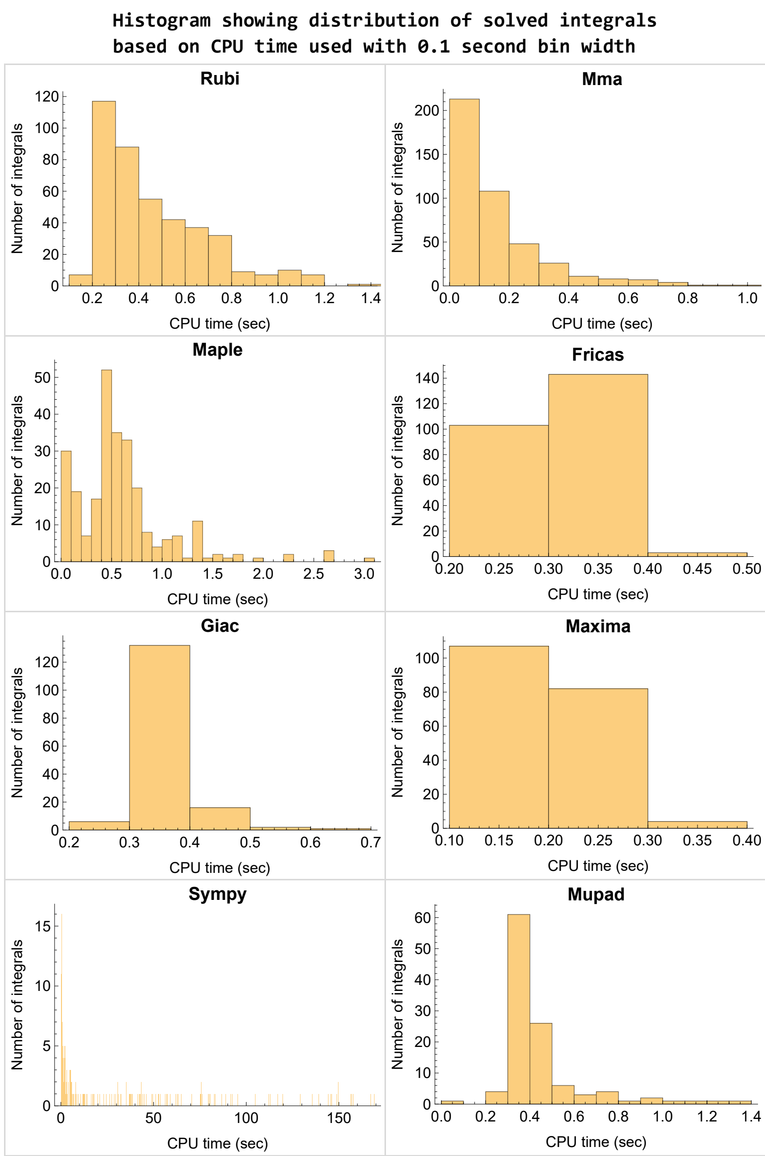


Figure 1.4: Solved integrals histogram based on CPU time used

1.8 Leaf size vs. CPU time used

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

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

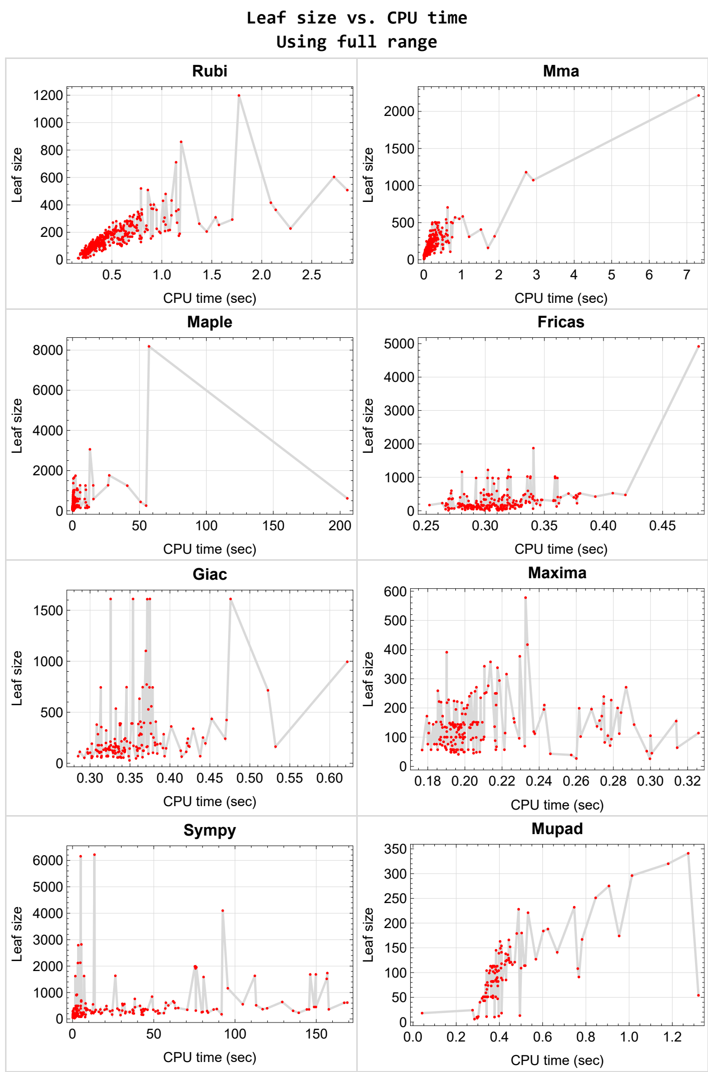


Figure 1.5: Leaf size vs. CPU time. Full range

1.9 list of integrals with no known antiderivative

{127, 128, 129, 157, 158, 159, 160, 161, 166, 167, 168, 170, 249, 250, 322, 323, 327, 328, 406, 407, 409, 410, 411, 412, 413, 414, 416, 417, 418, 419, 444, 445, 452, 453}

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

Rubi {}

Mathematica {166, 167, 168, 170, 322, 323, 406, 407, 409, 410, 411, 412, 413, 414, 416, 417, 418, 419, 444, 445}

Maple {}

Maxima {}

Fricas {}

Sympy {}

Giac {}

Mupad {}

1.11 list of integrals solved by CAS but failed verification

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

Rubi {251, 263, 276, 287, 298}

Mathematica {355, 363, 364, 365, 366, 408, 415, 424, 425, 426, 430, 431, 432}

Maple {31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 121, 122, 123, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 317, 326, 329, 330, 331, 332, 333, 334, 335, 336, 408, 415, 424, 425, 426, 430, 455, 456}

Maxima Verification phase not currently implemented.

Fricas Verification phase not currently implemented.

Sympy Verification phase not currently implemented.

Giac Verification phase not currently implemented.

Mupad Verification phase not currently implemented.

1.12 Timing

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

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

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

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

1.13 Verification

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

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

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

1.14 Important notes about some of the results

1.14.1 Important note about Maxima results

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

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

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

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

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

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

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

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

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

1.14.2 Important note about FriCAS result

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

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

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

1.14.3 Important note about finding leaf size of antiderivative

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

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

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

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

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

  except Exception as ee:
        leafCount =1
```

1.14.4 Important note about Mupad results

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

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

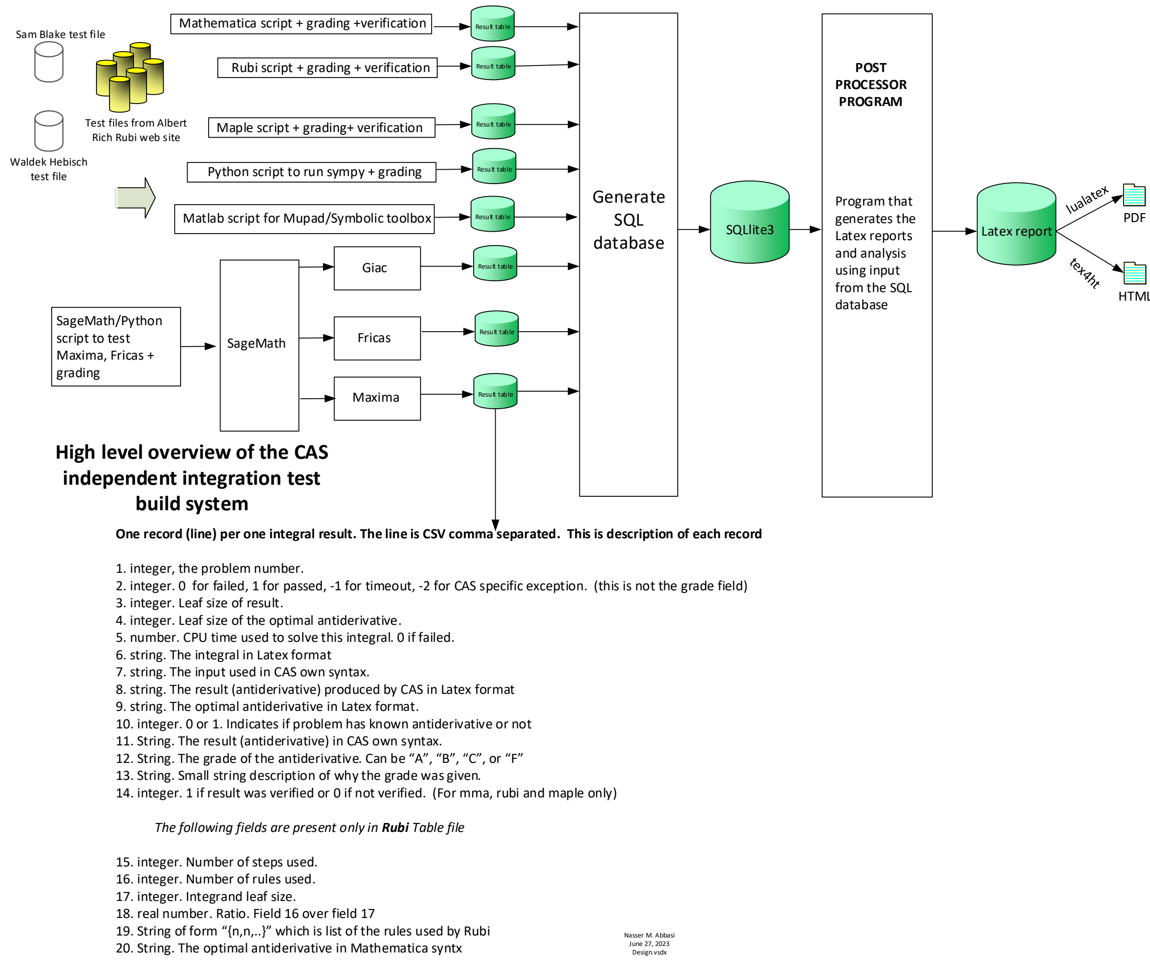
The following is an example of using Matlab's symbolic toolbox (Mupad) to solve an integral

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

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

1.15 Design of the test system

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



CHAPTER 2

DETAILED SUMMARY TABLES OF RESULTS

2.1 List of integrals sorted by grade for each CAS

2.1.1 Rubi

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 162, 163, 164, 165, 169, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 251, 252, 253, 254, 255, 256, 257, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 408, 415, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 446, 447, 448, 449, 450, 451, 454, 455, 456 }

B grade { 71 }

C grade { 258, 269, 282 }

F normal fail { }

F(-1) timedout fail { }

F(-2) exception fail { }

2.1.2 Mma

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 57, 58, 59, 60, 61, 62, 63, 64, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 116, 117, 118, 119, 120, 122, 123, 124, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 162, 163, 164, 165, 169, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 214, 215, 216, 217, 218, 219, 220, 223, 226, 227, 228, 229, 230, 232, 233, 241, 242, 243, 245, 246, 247, 251, 252, 253, 260, 261, 262, 263, 264, 265, 272, 273, 274, 275, 276, 277, 278, 282, 283, 284, 285, 286, 287, 288, 289, 293, 294, 295, 296, 297, 298, 299, 300, 305, 306, 307, 308, 309, 310, 311, 313, 314, 315, 316, 317, 318, 319, 320, 321, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 408, 415, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 432, 440, 441, 442, 443, 446, 447, 448, 449, 450, 451, 454, 455, 456 }

B grade { 56, 65, 115, 121, 166, 167, 168, 170, 213, 236, 237, 238, 239, 240, 244, 322, 323, 363, 406, 407, 409, 410, 411, 412, 413, 414, 416, 417, 418, 419, 430, 431, 444, 445 }

C grade { 221, 222, 224, 225, 231, 234, 235, 248, 254, 255, 256, 257, 258, 259, 266, 267, 268, 269, 270, 271, 279, 280, 281, 290, 291, 292, 301, 302, 303, 304, 312 }

F normal fail { 433, 434, 435, 436, 437, 438, 439 }

F(-1) timedout fail { }

F(-2) exception fail { }

2.1.3 Maple

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 42, 49, 57, 67, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 120, 147, 165, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 233, 241, 243, 275, 321, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 351, 352, 353, 354, 359, 360, 361, 362, 370, 371, 372, 376, 377, 378, 382, 395, 420, 421, 422, 423, 427, 428, 429, 443 }

B grade { 48, 56, 58, 65, 66, 68, 69, 70, 162, 163, 164, 232, 318, 319, 320, 367, 368, 369, 373, 374, 375, 379, 380, 381, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 440, 441, 442, 454 }

C grade { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 121, 122, 123, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 242, 244, 245, 246, 317, 326, 329, 330, 331, 332, 333, 334, 335, 336, 408, 415, 424, 425, 426, 430, 455, 456 }

F normal fail { 124, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 148, 149, 150, 151, 152, 153, 154, 155, 156, 169, 247, 248, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 324, 325, 350, 355, 356, 357, 358, 363, 364, 365, 366, 431, 432, 433, 434, 435, 436, 437, 438, 439, 446, 447, 448, 449, 450, 451 }

F(-1) timedout fail { }

F(-2) exception fail { }

2.1.4 Fricas

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 42, 49, 57, 58, 67, 68, 74, 75, 81, 82, 83, 130, 131, 132, 133, 137, 138, 139, 140, 144, 145, 146, 147, 151, 152, 153, 154, 165, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 233, 241, 242, 251, 252, 253, 260, 261, 262, 263, 264, 265, 272, 273, 274, 275, 276, 277, 278, 283, 284, 285, 286, 287, 288, 289, 293, 294, 295, 296, 297, 298, 299, 300, 305, 306, 307, 308, 309, 310, 315, 316, 317, 321, 348, 349, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 370, 382, 395, 408, 420, 421, 422, 423, 424, 443 }

B grade { 22, 48, 56, 65, 66, 69, 70, 76, 77, 78, 79, 80, 84, 85, 86, 87, 88, 89, 90, 91, 162, 163, 164, 198, 232, 318, 319, 320, 345, 346, 347, 350, 365, 366, 367, 368, 369, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 415, 425, 426, 427, 428, 429, 430, 431, 432, 440, 441, 442, 454 }

C grade { }

F normal fail { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 134, 135, 136, 141, 142, 143, 148, 149, 150, 155, 156, 169, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 243, 244, 245, 246, 247, 248, 254, 255, 256, 257, 258, 259, 266, 267, 268, 269, 270, 271, 279, 280, 281, 282, 290, 291, 292, 301, 302, 303, 304, 311, 312, 313, 314, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 446, 447, 448, 449, 450, 451, 455, 456 }

F(-1) timedout fail { }

F(-2) exception fail { 124, 125, 126, 127, 128, 129, 433, 434, 435, 436, 437, 438, 439 }

2.1.5 Maxima

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 42, 49, 57, 58, 67, 68, 69, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 120, 130, 131, 132, 133, 137, 138, 139, 140, 144, 145, 146, 147, 151, 152, 153, 154, 162, 163, 164, 165, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 233, 244, 275, 299, 309, 310, 315, 317, 318, 319, 320, 321, 337, 338, 339, 340, 341, 342, 343, 344, 351, 352, 353, 354, 356, 357, 358, 359, 360, 361, 362, 367, 368, 369, 370, 373, 374, 375, 379, 380, 381, 382, 385, 386, 387, 392, 393, 394, 395, 398, 399, 400, 421, 422, 423, 427, 428, 429, 440, 441, 442, 443 }

B grade { 48, 56, 65, 66, 70, 74, 75, 232, 241, 242, 243, 345, 346, 347, 348, 349, 454 }

C grade { }

F normal fail { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 71, 72, 73, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 121, 122, 123, 124, 125, 126, 134, 135, 136, 141, 142, 143, 148, 149, 150, 155, 156, 169, 210, 211, 212, 213, 214, 215, 221, 222, 224, 225, 231, 234, 235, 305, 306, 311, 312, 313, 314, 316, 329, 330, 331, 332, 333, 334, 335, 336, 350, 355, 363, 364, 365, 366, 408, 415, 420, 424, 425, 426, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 446, 447, 455, 456 }

F(-1) timedout fail { 64 }

F(-2) exception fail { 216, 217, 218, 219, 220, 226, 227, 228, 229, 230, 236, 237, 238, 239, 240, 245, 246, 247, 248, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 300, 301, 302, 303, 304, 307, 308, 324, 325, 326, 371, 372, 376, 377, 378, 383, 384, 388, 389, 390, 391, 396, 397, 401, 402, 403, 404, 405, 448, 449, 450, 451, 452, 453 }

2.1.6 Giac

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 28, 29, 30, 42, 49, 57, 58, 67, 68, 69, 70, 81, 144, 145, 146, 147, 154, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 233, 251, 252, 253, 275, 317, 352, 353, 354, 361, 375, 454 }

B grade { 22, 27, 48, 56, 65, 66, 76, 77, 78, 79, 80, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 162, 163, 164, 165, 198, 232, 318, 319, 320, 321, 351, 356, 357, 358, 359, 360, 362, 367, 368, 369, 371, 372, 373, 374, 376, 377, 378, 379, 380, 381, 385, 386, 387, 392, 393, 394, 398, 399, 400, 440, 441, 442, 443 }

C grade { }

F normal fail { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 74, 75, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 148, 149, 150, 151, 152, 153, 155, 156, 169, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 355, 363, 364, 365, 366, 370, 382, 383, 384, 388, 389, 390, 391, 395, 396, 397, 401, 402, 403, 404, 405, 408, 415, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 446, 447, 448, 449, 450, 451, 455, 456 }

F(-1) timedout fail { }

F(-2) exception fail { 170 }

2.1.7 Mupad

A grade { }

B grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 42, 48, 49, 56, 57, 58, 65, 66, 67, 68, 69, 70, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 223, 232, 233, 241, 242, 243, 244, 345, 346, 347, 348, 349, 454 }

C grade { }

F normal fail { }

F(-1) timedout fail { 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 162, 163, 164, 165, 169, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 228, 229, 230, 231, 234, 235, 236, 237, 238, 239, 240, 245, 246, 247, 248, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 324, 325, 326, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 408, 415, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 446, 447, 448, 449, 450, 451, 455, 456 }

F(-2) exception fail { }

2.1.8 Sympy

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 36, 37, 38, 39, 40, 44, 45, 46, 47, 50, 51, 52, 53, 54, 55, 59, 60, 61, 62, 63, 64, 71, 72, 73, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 120, 130, 131, 132, 133, 138, 139, 140, 144, 145, 146, 147, 151, 152, 153, 154, 169, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 221, 225, 231, 234, 242, 251, 252, 253, 263, 264, 265, 275, 276, 277, 278, 286, 287, 288, 289, 297, 298, 299, 300, 317, 329, 330, 331, 332, 335, 336, 337, 338, 339, 340, 343, 344, 352, 353, 360, 361, 386, 387, 388, 389, 390, 394, 395, 396, 400, 401, 402, 408, 415, 421, 424, 425 }

B grade { 42, 48, 49, 56, 57, 58, 65, 66, 67, 68, 69, 70, 162, 163, 164, 165, 223, 232, 233, 318, 319, 320, 321, 351, 354, 359, 362, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 392, 422, 423, 427, 428, 429, 443, 454 }

C grade { 35, 241, 243, 334, 342, 348, 349 }

F normal fail { 34, 41, 43, 74, 75, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 121, 122, 123, 124, 125, 126, 134, 135, 136, 142, 143, 148, 149, 150, 155, 156, 216, 217, 218, 219, 220, 222, 226, 227, 228, 229, 230, 236, 237, 238, 239, 244, 245, 246, 247, 248, 254, 255, 256, 257, 258, 259, 260, 261, 262, 266, 267, 270, 271, 272, 273, 279, 280, 281, 282, 283, 284, 285, 290, 291, 292, 293, 294, 295, 304, 305, 306, 309, 310, 311, 314, 315, 316, 326, 333, 341, 350, 355, 356, 357, 363, 364, 430, 431, 434, 435, 436, 437, 450, 451, 455, 456 }

F(-1) timedout fail { 137, 141, 214, 215, 224, 235, 240, 268, 269, 274, 296, 301, 302, 303, 307, 308, 312, 313, 324, 325, 358, 365, 366, 385, 391, 393, 397, 398, 399, 403, 404, 405, 426, 432, 433, 438, 439, 446, 447, 448, 449 }

F(-2) exception fail { 345, 346, 347, 420, 440, 441, 442 }

2.2 Detailed conclusion table per each integral for all CAS systems

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

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

Problem 1	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	48	51	48	58	57	69	66	69	51
N.S.	1	1.06	1.00	1.21	1.19	1.44	1.38	1.44	1.06
time (sec)	N/A	0.222	0.020	0.126	0.198	0.286	0.341	0.321	0.337

Problem 2	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	48	51	45	58	57	69	66	69	51
N.S.	1	1.06	0.94	1.21	1.19	1.44	1.38	1.44	1.06
time (sec)	N/A	0.232	0.019	0.070	0.196	0.314	0.243	0.322	0.331

Problem 3	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	48	51	48	58	57	69	66	69	51
N.S.	1	1.06	1.00	1.21	1.19	1.44	1.38	1.44	1.06
time (sec)	N/A	0.221	0.015	0.072	0.194	0.272	0.178	0.393	0.344

Problem 4	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	48	56	55	50	49	61	56	58	43
N.S.	1	1.17	1.15	1.04	1.02	1.27	1.17	1.21	0.90
time (sec)	N/A	0.214	0.004	0.086	0.199	0.312	0.141	0.314	0.332

Problem 5	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	44	44	43	46	41	45	65	47	40
N.S.	1	1.00	0.98	1.05	0.93	1.02	1.48	1.07	0.91
time (sec)	N/A	0.246	0.004	0.078	0.197	0.290	0.169	0.358	0.310

Problem 6	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	48	50	48	53	49	50	53	55	59
N.S.	1	1.04	1.00	1.10	1.02	1.04	1.10	1.15	1.23
time (sec)	N/A	0.256	0.020	0.079	0.195	0.293	1.640	0.342	0.337

Problem 7	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	60	61	41	47	57	53	58	57	47
N.S.	1	1.02	0.68	0.78	0.95	0.88	0.97	0.95	0.78
time (sec)	N/A	0.234	0.018	0.056	0.193	0.281	0.245	0.314	0.392

Problem 8	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	57	60	47	48	57	57	68	59	49
N.S.	1	1.05	0.82	0.84	1.00	1.00	1.19	1.04	0.86
time (sec)	N/A	0.233	0.018	0.054	0.194	0.290	0.317	0.366	0.369

Problem 9	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	74	75	81	101	100	118	121	123	82
N.S.	1	1.01	1.09	1.36	1.35	1.59	1.64	1.66	1.11
time (sec)	N/A	0.287	0.037	1.543	0.195	0.284	0.476	0.341	0.394

Problem 10	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	74	75	81	101	100	118	116	123	82
N.S.	1	1.01	1.09	1.36	1.35	1.59	1.57	1.66	1.11
time (sec)	N/A	0.278	0.030	0.611	0.190	0.286	0.347	0.414	0.369

Problem 11	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	74	73	81	101	100	118	121	123	82
N.S.	1	0.99	1.09	1.36	1.35	1.59	1.64	1.66	1.11
time (sec)	N/A	0.262	0.027	0.865	0.187	0.293	0.268	0.331	0.373

Problem 12	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	70	69	77	91	90	110	102	109	73
N.S.	1	0.99	1.10	1.30	1.29	1.57	1.46	1.56	1.04
time (sec)	N/A	0.232	0.029	0.399	0.194	0.293	0.188	0.335	0.362

Problem 13	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	80	81	83	97	84	98	131	96	75
N.S.	1	1.01	1.04	1.21	1.05	1.22	1.64	1.20	0.94
time (sec)	N/A	0.272	0.036	0.619	0.189	0.296	0.254	0.339	0.337

Problem 14	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	78	74	76	96	83	98	112	93	99
N.S.	1	0.95	0.97	1.23	1.06	1.26	1.44	1.19	1.27
time (sec)	N/A	0.274	0.038	0.452	0.193	0.301	0.329	0.373	0.353

Problem 15	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	84	85	84	97	90	101	99	102	99
N.S.	1	1.01	1.00	1.15	1.07	1.20	1.18	1.21	1.18
time (sec)	N/A	0.277	0.037	0.612	0.187	0.295	2.069	0.312	0.379

Problem 16	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	75	74	76	91	100	103	104	110	82
N.S.	1	0.99	1.01	1.21	1.33	1.37	1.39	1.47	1.09
time (sec)	N/A	0.259	0.029	0.588	0.189	0.294	0.321	0.343	0.392

Problem 17	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	95	94	80	91	100	106	122	111	85
N.S.	1	0.99	0.84	0.96	1.05	1.12	1.28	1.17	0.89
time (sec)	N/A	0.294	0.031	0.577	0.193	0.277	0.413	0.311	0.430

Problem 18	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	95	96	80	91	100	106	117	111	85
N.S.	1	1.01	0.84	0.96	1.05	1.12	1.23	1.17	0.89
time (sec)	N/A	0.300	0.033	0.566	0.195	0.278	0.539	0.314	0.414

Problem 19	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	100	99	133	144	143	167	170	177	113
N.S.	1	0.99	1.33	1.44	1.43	1.67	1.70	1.77	1.13
time (sec)	N/A	0.334	0.049	11.004	0.198	0.285	0.659	0.365	0.371

Problem 20	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	100	99	133	144	143	167	175	177	113
N.S.	1	0.99	1.33	1.44	1.43	1.67	1.75	1.77	1.13
time (sec)	N/A	0.337	0.040	5.903	0.200	0.288	0.502	0.365	0.371

Problem 21	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	122	110	130	142	141	167	167	174	112
N.S.	1	0.90	1.07	1.16	1.16	1.37	1.37	1.43	0.92
time (sec)	N/A	0.293	0.087	0.670	0.194	0.297	0.352	0.332	0.377

Problem 22	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	85	80	110	134	133	159	156	163	104
N.S.	1	0.94	1.29	1.58	1.56	1.87	1.84	1.92	1.22
time (sec)	N/A	0.238	0.033	0.456	0.198	0.302	0.265	0.532	0.356

Problem 23	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	122	119	123	144	127	149	199	145	106
N.S.	1	0.98	1.01	1.18	1.04	1.22	1.63	1.19	0.87
time (sec)	N/A	0.310	0.043	0.533	0.197	0.290	0.357	0.319	0.383

Problem 24	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	119	115	118	145	127	149	182	146	154
N.S.	1	0.97	0.99	1.22	1.07	1.25	1.53	1.23	1.29
time (sec)	N/A	0.313	0.052	0.849	0.192	0.298	0.446	0.362	0.409

Problem 25	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	118	114	115	143	125	150	182	141	139
N.S.	1	0.97	0.97	1.21	1.06	1.27	1.54	1.19	1.18
time (sec)	N/A	0.316	0.054	0.456	0.196	0.323	0.438	0.322	0.397

Problem 26	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	126	123	122	144	133	151	144	149	136
N.S.	1	0.98	0.97	1.14	1.06	1.20	1.14	1.18	1.08
time (sec)	N/A	0.328	0.054	0.497	0.202	0.308	2.457	0.391	0.439

Problem 27	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	90	85	109	134	143	152	158	162	118
N.S.	1	0.94	1.21	1.49	1.59	1.69	1.76	1.80	1.31
time (sec)	N/A	0.274	0.037	0.424	0.198	0.266	0.441	0.358	0.410

Problem 28	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	142	131	113	134	143	155	168	163	120
N.S.	1	0.92	0.80	0.94	1.01	1.09	1.18	1.15	0.85
time (sec)	N/A	0.316	0.038	0.424	0.197	0.302	0.556	0.424	0.447

Problem 29	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	133	132	113	134	143	155	177	163	121
N.S.	1	0.99	0.85	1.01	1.08	1.17	1.33	1.23	0.91
time (sec)	N/A	0.355	0.040	0.817	0.204	0.294	0.739	0.336	0.471

Problem 30	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	133	132	113	134	143	155	172	163	121
N.S.	1	0.99	0.85	1.01	1.08	1.17	1.29	1.23	0.91
time (sec)	N/A	0.361	0.037	0.447	0.207	0.281	0.954	0.334	0.453

Problem 31	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	148	148	142	272	0	0	267	0	0
N.S.	1	1.00	0.96	1.84	0.00	0.00	1.80	0.00	0.00
time (sec)	N/A	0.376	0.051	0.671	0.000	0.000	16.237	0.000	0.000

Problem 32	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	107	107	105	233	0	0	218	0	0
N.S.	1	1.00	0.98	2.18	0.00	0.00	2.04	0.00	0.00
time (sec)	N/A	0.330	0.036	0.395	0.000	0.000	12.897	0.000	0.000

Problem 33	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	69	69	66	188	0	0	163	0	0
N.S.	1	1.00	0.96	2.72	0.00	0.00	2.36	0.00	0.00
time (sec)	N/A	0.273	0.023	0.393	0.000	0.000	8.061	0.000	0.000

Problem 34	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	39	39	37	151	0	0	0	0	0
N.S.	1	1.00	0.95	3.87	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.212	0.006	0.398	0.000	0.000	0.000	0.000	0.000

Problem 35	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	C	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	44	44	63	181	0	0	175	0	0
N.S.	1	1.00	1.43	4.11	0.00	0.00	3.98	0.00	0.00
time (sec)	N/A	0.243	0.024	0.751	0.000	0.000	5.526	0.000	0.000

Problem 36	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	74	78	88	221	0	0	216	0	0
N.S.	1	1.05	1.19	2.99	0.00	0.00	2.92	0.00	0.00
time (sec)	N/A	0.399	0.056	0.763	0.000	0.000	32.453	0.000	0.000

Problem 37	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	110	116	124	264	0	0	265	0	0
N.S.	1	1.05	1.13	2.40	0.00	0.00	2.41	0.00	0.00
time (sec)	N/A	0.568	0.127	0.448	0.000	0.000	35.163	0.000	0.000

Problem 38	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	150	154	159	309	0	0	314	0	0
N.S.	1	1.03	1.06	2.06	0.00	0.00	2.09	0.00	0.00
time (sec)	N/A	0.771	0.114	0.474	0.000	0.000	52.480	0.000	0.000

Problem 39	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	152	157	141	298	0	0	323	0	0
N.S.	1	1.03	0.93	1.96	0.00	0.00	2.12	0.00	0.00
time (sec)	N/A	0.430	0.079	0.411	0.000	0.000	24.564	0.000	0.000

Problem 40	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	98	112	98	250	0	0	269	0	0
N.S.	1	1.14	1.00	2.55	0.00	0.00	2.74	0.00	0.00
time (sec)	N/A	0.376	0.060	0.408	0.000	0.000	12.077	0.000	0.000

Problem 41	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	65	70	71	205	0	0	0	0	0
N.S.	1	1.08	1.09	3.15	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.296	0.040	0.785	0.000	0.000	0.000	0.000	0.000

Problem 42	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	39	39	41	54	63	51	153	64	54
N.S.	1	1.00	1.05	1.38	1.62	1.31	3.92	1.64	1.38
time (sec)	N/A	0.180	0.019	0.395	0.190	0.317	0.621	0.329	1.321

Problem 43	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	80	94	96	229	0	0	0	0	0
N.S.	1	1.18	1.20	2.86	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.422	0.053	0.436	0.000	0.000	0.000	0.000	0.000

Problem 44	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	114	114	120	276	0	0	318	0	0
N.S.	1	1.00	1.05	2.42	0.00	0.00	2.79	0.00	0.00
time (sec)	N/A	0.369	0.087	0.444	0.000	0.000	30.604	0.000	0.000

Problem 45	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	154	154	165	331	0	0	376	0	0
N.S.	1	1.00	1.07	2.15	0.00	0.00	2.44	0.00	0.00
time (sec)	N/A	0.417	0.137	0.497	0.000	0.000	43.486	0.000	0.000

Problem 46	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	149	155	150	303	0	0	391	0	0
N.S.	1	1.04	1.01	2.03	0.00	0.00	2.62	0.00	0.00
time (sec)	N/A	0.491	0.091	0.443	0.000	0.000	27.599	0.000	0.000

Problem 47	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	107	116	122	258	0	0	347	0	0
N.S.	1	1.08	1.14	2.41	0.00	0.00	3.24	0.00	0.00
time (sec)	N/A	0.408	0.076	0.433	0.000	0.000	19.769	0.000	0.000

Problem 48	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	62	60	75	137	114	115	398	124	108
N.S.	1	0.97	1.21	2.21	1.84	1.85	6.42	2.00	1.74
time (sec)	N/A	0.231	0.082	0.412	0.200	0.289	1.792	0.320	0.763

Problem 49	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	76	63	53	132	99	107	415	104	91
N.S.	1	0.83	0.70	1.74	1.30	1.41	5.46	1.37	1.20
time (sec)	N/A	0.219	0.036	0.616	0.206	0.290	1.881	0.300	0.768

Problem 50	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	134	168	141	273	0	0	352	0	0
N.S.	1	1.25	1.05	2.04	0.00	0.00	2.63	0.00	0.00
time (sec)	N/A	0.678	0.078	0.900	0.000	0.000	36.997	0.000	0.000

Problem 51	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	171	171	173	324	0	0	444	0	0
N.S.	1	1.00	1.01	1.89	0.00	0.00	2.60	0.00	0.00
time (sec)	N/A	0.438	0.105	0.555	0.000	0.000	38.432	0.000	0.000

Problem 52	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	217	217	227	386	0	0	496	0	0
N.S.	1	1.00	1.05	1.78	0.00	0.00	2.29	0.00	0.00
time (sec)	N/A	0.494	0.226	0.681	0.000	0.000	41.528	0.000	0.000

Problem 53	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	229	241	249	405	0	0	617	0	0
N.S.	1	1.05	1.09	1.77	0.00	0.00	2.69	0.00	0.00
time (sec)	N/A	0.698	0.182	0.559	0.000	0.000	62.664	0.000	0.000

Problem 54	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	183	198	207	355	0	0	563	0	0
N.S.	1	1.08	1.13	1.94	0.00	0.00	3.08	0.00	0.00
time (sec)	N/A	0.636	0.140	0.527	0.000	0.000	31.903	0.000	0.000

Problem 55	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	141	158	179	310	0	0	518	0	0
N.S.	1	1.12	1.27	2.20	0.00	0.00	3.67	0.00	0.00
time (sec)	N/A	0.543	0.148	0.542	0.000	0.000	30.940	0.000	0.000

Problem 56	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	79	78	172	165	179	178	677	202	167
N.S.	1	0.99	2.18	2.09	2.27	2.25	8.57	2.56	2.11
time (sec)	N/A	0.260	0.080	0.507	0.200	0.297	5.379	0.381	0.782

Problem 57	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	117	97	135	205	150	162	661	163	141
N.S.	1	0.83	1.15	1.75	1.28	1.38	5.65	1.39	1.21
time (sec)	N/A	0.285	0.064	0.507	0.193	0.299	5.317	0.335	0.667

Problem 58	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	95	77	66	188	144	160	700	147	127
N.S.	1	0.81	0.69	1.98	1.52	1.68	7.37	1.55	1.34
time (sec)	N/A	0.230	0.040	0.490	0.196	0.319	5.353	0.360	0.569

Problem 59	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	174	256	222	316	0	0	510	0	0
N.S.	1	1.47	1.28	1.82	0.00	0.00	2.93	0.00	0.00
time (sec)	N/A	1.012	0.115	0.710	0.000	0.000	58.961	0.000	0.000

Problem 60	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	211	211	231	370	0	0	614	0	0
N.S.	1	1.00	1.09	1.75	0.00	0.00	2.91	0.00	0.00
time (sec)	N/A	0.514	0.166	0.754	0.000	0.000	57.442	0.000	0.000

Problem 61	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	263	263	276	438	0	0	668	0	0
N.S.	1	1.00	1.05	1.67	0.00	0.00	2.54	0.00	0.00
time (sec)	N/A	0.573	0.197	0.924	0.000	0.000	61.944	0.000	0.000

Problem 62	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	329	366	403	561	0	0	1686	0	0
N.S.	1	1.11	1.22	1.71	0.00	0.00	5.12	0.00	0.00
time (sec)	N/A	1.152	0.300	1.670	0.000	0.000	149.758	0.000	0.000

Problem 63	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	285	324	356	511	0	0	1632	0	0
N.S.	1	1.14	1.25	1.79	0.00	0.00	5.73	0.00	0.00
time (sec)	N/A	1.094	0.326	1.335	0.000	0.000	112.194	0.000	0.000

Problem 64	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-1)	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	243	279	333	466	0	0	1588	0	0
N.S.	1	1.15	1.37	1.92	0.00	0.00	6.53	0.00	0.00
time (sec)	N/A	1.001	0.297	1.302	0.000	0.000	80.640	0.000	0.000

Problem 65	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	136	127	335	395	377	361	1911	424	341
N.S.	1	0.93	2.46	2.90	2.77	2.65	14.05	3.12	2.51
time (sec)	N/A	0.326	0.192	1.500	0.230	0.305	75.709	0.471	1.274

Problem 66	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	163	148	316	435	358	356	1972	394	320
N.S.	1	0.91	1.94	2.67	2.20	2.18	12.10	2.42	1.96
time (sec)	N/A	0.345	0.182	1.352	0.214	0.312	75.511	0.376	1.181

Problem 67	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	226	191	281	413	338	343	1979	361	296
N.S.	1	0.85	1.24	1.83	1.50	1.52	8.76	1.60	1.31
time (sec)	N/A	0.472	0.175	1.335	0.218	0.299	75.704	0.402	1.013

Problem 68	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	199	164	192	383	316	333	1986	322	275
N.S.	1	0.82	0.96	1.92	1.59	1.67	9.98	1.62	1.38
time (sec)	N/A	0.395	0.129	1.336	0.222	0.300	75.270	0.320	0.907

Problem 69	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	174	139	160	404	294	323	1992	283	251
N.S.	1	0.80	0.92	2.32	1.69	1.86	11.45	1.63	1.44
time (sec)	N/A	0.327	0.099	1.270	0.219	0.308	75.495	0.364	0.845

Problem 70	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	B	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	152	119	99	386	276	310	1955	252	232
N.S.	1	0.78	0.65	2.54	1.82	2.04	12.86	1.66	1.53
time (sec)	N/A	0.272	0.103	1.316	0.213	0.324	76.214	0.441	0.746

Problem 71	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	B	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	294	604	349	445	0	0	1518	0	0
N.S.	1	2.05	1.19	1.51	0.00	0.00	5.16	0.00	0.00
time (sec)	N/A	2.643	0.249	2.211	0.000	0.000	156.444	0.000	0.000

Problem 72	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	339	339	401	508	0	0	1685	0	0
N.S.	1	1.00	1.18	1.50	0.00	0.00	4.97	0.00	0.00
time (sec)	N/A	0.799	0.391	2.681	0.000	0.000	146.271	0.000	0.000

Problem 73	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	401	401	486	594	0	0	1737	0	0
N.S.	1	1.00	1.21	1.48	0.00	0.00	4.33	0.00	0.00
time (sec)	N/A	0.861	0.327	3.621	0.000	0.000	156.804	0.000	0.000

Problem 74	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	12	12	12	9	48	11	0	0	8
N.S.	1	1.00	1.00	0.75	4.00	0.92	0.00	0.00	0.67
time (sec)	N/A	0.156	0.004	0.371	0.206	0.269	0.000	0.000	0.298

Problem 75	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	10	10	11	7	45	9	0	0	6
N.S.	1	1.00	1.10	0.70	4.50	0.90	0.00	0.00	0.60
time (sec)	N/A	0.166	0.003	0.383	0.205	0.304	0.000	0.000	0.285

Problem 76	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	109	109	82	156	151	219	185	241	116
N.S.	1	1.00	0.75	1.43	1.39	2.01	1.70	2.21	1.06
time (sec)	N/A	0.330	0.041	0.148	0.209	0.307	0.347	0.469	0.460

Problem 77	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	109	109	82	155	150	219	184	238	116
N.S.	1	1.00	0.75	1.42	1.38	2.01	1.69	2.18	1.06
time (sec)	N/A	0.290	0.041	0.131	0.204	0.267	0.260	0.331	0.425

Problem 78	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	101	101	77	141	136	200	163	215	104
N.S.	1	1.00	0.76	1.40	1.35	1.98	1.61	2.13	1.03
time (sec)	N/A	0.261	0.035	0.181	0.216	0.281	0.189	0.339	0.397

Problem 79	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	70	63	59	114	101	144	138	144	85
N.S.	1	0.90	0.84	1.63	1.44	2.06	1.97	2.06	1.21
time (sec)	N/A	0.325	0.017	0.164	0.210	0.278	0.245	0.350	0.383

Problem 80	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	72	72	63	114	114	149	141	162	138
N.S.	1	1.00	0.88	1.58	1.58	2.07	1.96	2.25	1.92
time (sec)	N/A	0.296	0.030	0.170	0.222	0.284	1.820	0.329	0.429

Problem 81	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	103	103	90	130	150	179	165	192	109
N.S.	1	1.00	0.87	1.26	1.46	1.74	1.60	1.86	1.06
time (sec)	N/A	0.323	0.037	0.116	0.199	0.287	0.252	0.302	0.500

Problem 82	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	109	109	82	131	151	187	185	195	114
N.S.	1	1.00	0.75	1.20	1.39	1.72	1.70	1.79	1.05
time (sec)	N/A	0.323	0.040	0.123	0.206	0.268	0.323	0.331	0.515

Problem 83	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	109	109	82	131	151	188	187	195	114
N.S.	1	1.00	0.75	1.20	1.39	1.72	1.72	1.79	1.05
time (sec)	N/A	0.308	0.041	0.138	0.207	0.280	0.402	0.444	0.520

Problem 84	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	178	178	149	262	250	364	311	408	180
N.S.	1	1.00	0.84	1.47	1.40	2.04	1.75	2.29	1.01
time (sec)	N/A	0.408	0.062	4.697	0.217	0.272	0.475	0.382	0.503

Problem 85	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	178	178	134	262	250	363	308	408	179
N.S.	1	1.00	0.75	1.47	1.40	2.04	1.73	2.29	1.01
time (sec)	N/A	0.379	0.065	2.641	0.216	0.270	0.350	0.363	0.480

Problem 86	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	173	155	135	247	235	347	286	385	166
N.S.	1	0.90	0.78	1.43	1.36	2.01	1.65	2.23	0.96
time (sec)	N/A	0.359	0.052	0.601	0.208	0.272	0.260	0.360	0.444

Problem 87	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	137	169	114	223	198	293	269	285	152
N.S.	1	1.23	0.83	1.63	1.45	2.14	1.96	2.08	1.11
time (sec)	N/A	0.632	0.029	0.748	0.199	0.286	0.367	0.392	0.449

Problem 88	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	133	133	107	226	200	291	255	274	228
N.S.	1	1.00	0.80	1.70	1.50	2.19	1.92	2.06	1.71
time (sec)	N/A	0.356	0.031	0.751	0.201	0.293	0.432	0.361	0.489

Problem 89	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	137	137	117	217	210	291	258	290	221
N.S.	1	1.00	0.85	1.58	1.53	2.12	1.88	2.12	1.61
time (sec)	N/A	0.391	0.058	0.707	0.201	0.311	2.468	0.363	0.532

Problem 90	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	168	168	131	238	250	326	287	354	184
N.S.	1	1.00	0.78	1.42	1.49	1.94	1.71	2.11	1.10
time (sec)	N/A	0.411	0.066	0.719	0.211	0.314	0.335	0.364	0.603

Problem 91	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	178	178	134	238	251	332	309	355	188
N.S.	1	1.00	0.75	1.34	1.41	1.87	1.74	1.99	1.06
time (sec)	N/A	0.391	0.065	0.503	0.203	0.299	0.432	0.314	0.624

Problem 92	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	271	271	211	732	0	0	0	0	0
N.S.	1	1.00	0.78	2.70	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.495	0.118	0.569	0.000	0.000	0.000	0.000	0.000

Problem 93	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	200	200	158	637	0	0	0	0	0
N.S.	1	1.00	0.79	3.18	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.442	0.067	0.487	0.000	0.000	0.000	0.000	0.000

Problem 94	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	130	130	103	528	0	0	0	0	0
N.S.	1	1.00	0.79	4.06	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.337	0.054	0.429	0.000	0.000	0.000	0.000	0.000

Problem 95	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	72	67	68	445	0	0	0	0	0
N.S.	1	0.93	0.94	6.18	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.321	0.022	0.371	0.000	0.000	0.000	0.000	0.000

Problem 96	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	79	73	94	528	0	0	0	0	0
N.S.	1	0.92	1.19	6.68	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.372	0.040	0.415	0.000	0.000	0.000	0.000	0.000

Problem 97	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	135	129	130	615	0	0	0	0	0
N.S.	1	0.96	0.96	4.56	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.762	0.078	0.414	0.000	0.000	0.000	0.000	0.000

Problem 98	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	204	190	185	731	0	0	0	0	0
N.S.	1	0.93	0.91	3.58	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.107	0.101	0.458	0.000	0.000	0.000	0.000	0.000

Problem 99	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	273	254	237	828	0	0	0	0	0
N.S.	1	0.93	0.87	3.03	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.511	0.096	0.533	0.000	0.000	0.000	0.000	0.000

Problem 100	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	281	281	240	824	0	0	0	0	0
N.S.	1	1.00	0.85	2.93	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.521	0.142	0.552	0.000	0.000	0.000	0.000	0.000

Problem 101	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	203	203	186	700	0	0	0	0	0
N.S.	1	1.00	0.92	3.45	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.469	0.112	0.511	0.000	0.000	0.000	0.000	0.000

Problem 102	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	143	143	142	609	0	0	0	0	0
N.S.	1	1.00	0.99	4.26	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.391	0.097	0.415	0.000	0.000	0.000	0.000	0.000

Problem 103	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	77	71	81	369	0	0	0	0	0
N.S.	1	0.92	1.05	4.79	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.270	0.037	0.397	0.000	0.000	0.000	0.000	0.000

Problem 104	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	151	155	166	683	0	0	0	0	0
N.S.	1	1.03	1.10	4.52	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.847	0.120	0.431	0.000	0.000	0.000	0.000	0.000

Problem 105	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	211	211	223	790	0	0	0	0	0
N.S.	1	1.00	1.06	3.74	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.538	0.223	0.445	0.000	0.000	0.000	0.000	0.000

Problem 106	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	285	285	268	924	0	0	0	0	0
N.S.	1	1.00	0.94	3.24	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.627	0.142	0.485	0.000	0.000	0.000	0.000	0.000

Problem 107	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	296	327	258	827	0	0	0	0	0
N.S.	1	1.10	0.87	2.79	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.712	0.189	0.519	0.000	0.000	0.000	0.000	0.000

Problem 108	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	232	262	212	738	0	0	0	0	0
N.S.	1	1.13	0.91	3.18	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.632	0.165	0.451	0.000	0.000	0.000	0.000	0.000

Problem 109	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	112	107	155	484	0	0	0	0	0
N.S.	1	0.96	1.38	4.32	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.397	0.152	0.515	0.000	0.000	0.000	0.000	0.000

Problem 110	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	126	127	146	435	0	0	0	0	0
N.S.	1	1.01	1.16	3.45	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.500	0.069	0.478	0.000	0.000	0.000	0.000	0.000

Problem 111	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	257	293	232	793	0	0	0	0	0
N.S.	1	1.14	0.90	3.09	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.614	0.177	0.519	0.000	0.000	0.000	0.000	0.000

Problem 112	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	322	335	290	908	0	0	0	0	0
N.S.	1	1.04	0.90	2.82	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.747	0.294	0.497	0.000	0.000	0.000	0.000	0.000

Problem 113	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	398	430	344	943	0	0	0	0	0
N.S.	1	1.08	0.86	2.37	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.990	0.444	0.562	0.000	0.000	0.000	0.000	0.000

Problem 114	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	333	364	298	854	0	0	0	0	0
N.S.	1	1.09	0.89	2.56	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.919	0.316	0.603	0.000	0.000	0.000	0.000	0.000

Problem 115	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	161	155	371	593	0	0	0	0	0
N.S.	1	0.96	2.30	3.68	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.545	0.325	0.520	0.000	0.000	0.000	0.000	0.000

Problem 116	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	210	213	281	508	0	0	0	0	0
N.S.	1	1.01	1.34	2.42	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.720	0.162	0.559	0.000	0.000	0.000	0.000	0.000

Problem 117	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	203	204	211	495	0	0	0	0	0
N.S.	1	1.00	1.04	2.44	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.781	0.115	0.513	0.000	0.000	0.000	0.000	0.000

Problem 118	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	351	508	318	894	0	0	0	0	0
N.S.	1	1.45	0.91	2.55	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	2.793	0.276	0.684	0.000	0.000	0.000	0.000	0.000

Problem 119	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	420	432	378	1015	0	0	0	0	0
N.S.	1	1.03	0.90	2.42	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.057	0.453	0.655	0.000	0.000	0.000	0.000	0.000

Problem 120	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	107	164	96	180	132	0	374	0	0
N.S.	1	1.53	0.90	1.68	1.23	0.00	3.50	0.00	0.00
time (sec)	N/A	0.588	0.088	0.319	0.203	0.000	20.968	0.000	0.000

Problem 121	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	113	104	243	967	0	0	0	0	0
N.S.	1	0.92	2.15	8.56	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.467	0.142	0.552	0.000	0.000	0.000	0.000	0.000

Problem 122	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	217	214	432	1373	0	0	0	0	0
N.S.	1	0.99	1.99	6.33	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.013	0.363	0.553	0.000	0.000	0.000	0.000	0.000

Problem 123	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	361	416	706	1607	0	0	0	0	0
N.S.	1	1.15	1.96	4.45	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	2.011	0.632	0.629	0.000	0.000	0.000	0.000	0.000

Problem 124	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F(-2)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	189	189	169	0	0	0	0	0	0
N.S.	1	1.00	0.89	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.482	0.202	0.000	0.000	0.000	0.000	0.000	0.000

Problem 125	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F(-2)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	298	298	287	0	0	0	0	0	0
N.S.	1	1.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.711	0.256	0.000	0.000	0.000	0.000	0.000	0.000

Problem 126	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F(-2)	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	402	402	366	0	0	0	0	0	0
N.S.	1	1.00	0.91	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.895	0.416	0.000	0.000	0.000	0.000	0.000	0.000

Problem 127	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	0	19	22	22
N.S.	1	1.00	1.09	0.91	1.00	0.00	0.86	1.00	1.00
time (sec)	N/A	0.195	7.966	0.026	0.264	0.000	0.372	0.426	0.340

Problem 128	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	0	20	22	22
N.S.	1	1.00	1.09	0.91	1.00	0.00	0.91	1.00	1.00
time (sec)	N/A	0.287	5.644	0.025	0.284	0.000	0.838	0.316	0.393

Problem 129	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	22	22	24	20	22	0	20	22	22
N.S.	1	1.00	1.09	0.91	1.00	0.00	0.91	1.00	1.00
time (sec)	N/A	0.366	13.808	0.024	0.263	0.000	1.730	0.376	0.388

Problem 130	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	242	218	183	0	227	495	347	0	0
N.S.	1	0.90	0.76	0.00	0.94	2.05	1.43	0.00	0.00
time (sec)	N/A	0.501	0.166	0.000	0.279	0.334	70.597	0.000	0.000

Problem 131	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	192	188	151	0	184	396	284	0	0
N.S.	1	0.98	0.79	0.00	0.96	2.06	1.48	0.00	0.00
time (sec)	N/A	0.423	0.134	0.000	0.284	0.314	51.038	0.000	0.000

Problem 132	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	142	131	116	0	143	291	221	0	0
N.S.	1	0.92	0.82	0.00	1.01	2.05	1.56	0.00	0.00
time (sec)	N/A	0.280	0.084	0.000	0.291	0.334	56.221	0.000	0.000

Problem 133	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	94	87	77	0	93	184	144	0	0
N.S.	1	0.93	0.82	0.00	0.99	1.96	1.53	0.00	0.00
time (sec)	N/A	0.216	0.060	0.000	0.279	0.326	29.543	0.000	0.000

Problem 134	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	211	217	332	0	0	0	0	0	0
N.S.	1	1.03	1.57	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.024	0.163	0.000	0.000	0.000	0.000	0.000	0.000

Problem 135	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	221	215	392	0	0	0	0	0	0
N.S.	1	0.97	1.77	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.540	0.203	0.000	0.000	0.000	0.000	0.000	0.000

Problem 136	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	298	276	500	0	0	0	0	0	0
N.S.	1	0.93	1.68	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.618	0.337	0.000	0.000	0.000	0.000	0.000	0.000

Problem 137	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	263	234	187	0	239	595	0	0	0
N.S.	1	0.89	0.71	0.00	0.91	2.26	0.00	0.00	0.00
time (sec)	N/A	0.516	0.192	0.000	0.275	0.336	0.000	0.000	0.000

Problem 138	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	213	207	153	0	196	496	643	0	0
N.S.	1	0.97	0.72	0.00	0.92	2.33	3.02	0.00	0.00
time (sec)	N/A	0.439	0.150	0.000	0.268	0.339	129.067	0.000	0.000

Problem 139	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	163	147	120	0	155	391	517	0	0
N.S.	1	0.90	0.74	0.00	0.95	2.40	3.17	0.00	0.00
time (sec)	N/A	0.299	0.115	0.000	0.314	0.340	113.002	0.000	0.000

Problem 140	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	115	103	87	0	105	288	377	0	0
N.S.	1	0.90	0.76	0.00	0.91	2.50	3.28	0.00	0.00
time (sec)	N/A	0.234	0.062	0.000	0.277	0.326	88.800	0.000	0.000

Problem 141	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	255	309	391	0	0	0	0	0	0
N.S.	1	1.21	1.53	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.452	0.188	0.000	0.000	0.000	0.000	0.000	0.000

Problem 142	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	259	251	480	0	0	0	0	0	0
N.S.	1	0.97	1.85	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.595	0.220	0.000	0.000	0.000	0.000	0.000	0.000

Problem 143	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	293	280	501	0	0	0	0	0	0
N.S.	1	0.96	1.71	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.649	0.352	0.000	0.000	0.000	0.000	0.000	0.000

Problem 144	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	217	198	150	0	215	395	396	252	0
N.S.	1	0.91	0.69	0.00	0.99	1.82	1.82	1.16	0.00
time (sec)	N/A	0.485	0.147	0.000	0.275	0.320	57.096	0.379	0.000

Problem 145	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	169	167	118	0	172	296	337	192	0
N.S.	1	0.99	0.70	0.00	1.02	1.75	1.99	1.14	0.00
time (sec)	N/A	0.407	0.124	0.000	0.274	0.358	42.283	0.388	0.000

Problem 146	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	119	113	80	0	127	189	272	131	0
N.S.	1	0.95	0.67	0.00	1.07	1.59	2.29	1.10	0.00
time (sec)	N/A	0.272	0.074	0.000	0.273	0.306	32.670	0.359	0.000

Problem 147	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	69	67	55	62	82	116	131	74	0
N.S.	1	0.97	0.80	0.90	1.19	1.68	1.90	1.07	0.00
time (sec)	N/A	0.202	0.032	0.400	0.275	0.304	2.295	0.322	0.000

Problem 148	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	152	145	249	0	0	0	0	0	0
N.S.	1	0.95	1.64	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.610	0.068	0.000	0.000	0.000	0.000	0.000	0.000

Problem 149	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	226	220	392	0	0	0	0	0	0
N.S.	1	0.97	1.73	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.518	0.168	0.000	0.000	0.000	0.000	0.000	0.000

Problem 150	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	304	280	501	0	0	0	0	0	0
N.S.	1	0.92	1.65	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.616	0.226	0.000	0.000	0.000	0.000	0.000	0.000

Problem 151	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	194	180	159	0	200	435	369	0	0
N.S.	1	0.93	0.82	0.00	1.03	2.24	1.90	0.00	0.00
time (sec)	N/A	0.473	0.086	0.000	0.282	0.340	116.990	0.000	0.000

Problem 152	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	146	146	124	0	157	330	308	0	0
N.S.	1	1.00	0.85	0.00	1.08	2.26	2.11	0.00	0.00
time (sec)	N/A	0.400	0.083	0.000	0.273	0.319	135.748	0.000	0.000

Problem 153	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	94	92	83	0	112	223	177	0	0
N.S.	1	0.98	0.88	0.00	1.19	2.37	1.88	0.00	0.00
time (sec)	N/A	0.268	0.049	0.000	0.283	0.378	91.742	0.000	0.000

Problem 154	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	53	53	53	0	71	155	88	71	0
N.S.	1	1.00	1.00	0.00	1.34	2.92	1.66	1.34	0.00
time (sec)	N/A	0.195	0.033	0.000	0.278	0.317	3.852	0.360	0.000

Problem 155	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	201	209	295	0	0	0	0	0	0
N.S.	1	1.04	1.47	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.985	0.188	0.000	0.000	0.000	0.000	0.000	0.000

Problem 156	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	253	234	506	0	0	0	0	0	0
N.S.	1	0.92	2.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.714	0.299	0.000	0.000	0.000	0.000	0.000	0.000

Problem 157	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	23	23	25	23	25	31	19	25	25
N.S.	1	1.00	1.09	1.00	1.09	1.35	0.83	1.09	1.09
time (sec)	N/A	0.228	1.756	0.003	0.220	0.279	0.792	0.301	0.267

Problem 158	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	21	21	23	21	23	29	17	23	23
N.S.	1	1.00	1.10	1.00	1.10	1.38	0.81	1.10	1.10
time (sec)	N/A	0.205	1.210	0.020	0.237	0.286	0.849	0.396	0.273

Problem 159	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	20	20	22	20	22	27	17	22	22
N.S.	1	1.00	1.10	1.00	1.10	1.35	0.85	1.10	1.10
time (sec)	N/A	0.182	0.023	0.022	0.239	0.292	0.992	0.307	0.256

Problem 160	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	23	23	25	23	25	33	19	25	25
N.S.	1	1.00	1.09	1.00	1.09	1.43	0.83	1.09	1.09
time (sec)	N/A	0.222	0.887	0.029	0.242	0.272	1.441	0.304	0.275

Problem 161	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	23	23	25	23	25	37	20	25	25
N.S.	1	1.00	1.09	1.00	1.09	1.61	0.87	1.09	1.09
time (sec)	N/A	0.226	1.019	0.003	0.319	0.293	1.125	0.293	0.276

Problem 162	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	211	206	152	1746	271	1222	6156	536	0
N.S.	1	0.98	0.72	8.27	1.28	5.79	29.18	2.54	0.00
time (sec)	N/A	0.533	0.168	2.220	0.287	0.320	4.987	0.332	0.000

Problem 163	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	153	183	108	911	195	633	2791	374	0
N.S.	1	1.20	0.71	5.95	1.27	4.14	18.24	2.44	0.00
time (sec)	N/A	0.444	0.104	1.054	0.243	0.319	3.510	0.337	0.000

Problem 164	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	95	94	64	353	119	235	899	212	0
N.S.	1	0.99	0.67	3.72	1.25	2.47	9.46	2.23	0.00
time (sec)	N/A	0.279	0.054	0.217	0.237	0.334	2.389	0.326	0.000

Problem 165	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	46	46	32	68	57	52	141	95	0
N.S.	1	1.00	0.70	1.48	1.24	1.13	3.07	2.07	0.00
time (sec)	N/A	0.183	0.012	0.082	0.202	0.313	2.069	0.384	0.000

Problem 166	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	23	23	72	23	25	31	20	25	25
N.S.	1	1.00	3.13	1.00	1.09	1.35	0.87	1.09	1.09
time (sec)	N/A	0.206	0.129	0.035	0.252	0.319	2.083	0.341	0.473

Problem 167	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	23	23	72	23	25	42	22	25	25
N.S.	1	1.00	3.13	1.00	1.09	1.83	0.96	1.09	1.09
time (sec)	N/A	0.203	0.118	0.036	0.273	0.343	4.029	0.337	0.510

Problem 168	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	15	15	173	15	112	17	15	17	17
N.S.	1	1.00	11.53	1.00	7.47	1.13	1.00	1.13	1.13
time (sec)	N/A	0.162	0.161	0.033	0.296	0.332	7.503	0.417	0.284

Problem 169	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	68	68	61	0	0	0	238	0	0
N.S.	1	1.00	0.90	0.00	0.00	0.00	3.50	0.00	0.00
time (sec)	N/A	0.193	0.017	0.000	0.000	0.000	6.235	0.000	0.000

Problem 170	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	F(-2)	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	17	17	89	17	19	19	15	0	19
N.S.	1	1.00	5.24	1.00	1.12	1.12	0.88	0.00	1.12
time (sec)	N/A	0.178	0.042	0.027	0.241	0.303	4.980	0.000	0.300

Problem 171	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	48	49	69	58	57	69	66	69	51
N.S.	1	1.02	1.44	1.21	1.19	1.44	1.38	1.44	1.06
time (sec)	N/A	0.220	0.005	0.379	0.205	0.293	0.873	0.322	0.339

Problem 172	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	48	49	69	58	57	69	66	69	51
N.S.	1	1.02	1.44	1.21	1.19	1.44	1.38	1.44	1.06
time (sec)	N/A	0.215	0.005	0.204	0.190	0.325	0.458	0.348	0.332

Problem 173	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	47	47	69	58	57	67	66	69	51
N.S.	1	1.00	1.47	1.23	1.21	1.43	1.40	1.47	1.09
time (sec)	N/A	0.212	0.005	0.168	0.221	0.325	0.237	0.438	0.325

Problem 174	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	52	52	57	58	49	55	78	52	48
N.S.	1	1.00	1.10	1.12	0.94	1.06	1.50	1.00	0.92
time (sec)	N/A	0.229	0.001	0.076	0.208	0.289	0.224	0.302	0.320

Problem 175	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	52	55	57	58	49	59	63	56	66
N.S.	1	1.06	1.10	1.12	0.94	1.13	1.21	1.08	1.27
time (sec)	N/A	0.229	0.005	0.080	0.200	0.303	1.293	0.334	0.342

Problem 176	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	57	58	69	53	57	60	68	65	51
N.S.	1	1.02	1.21	0.93	1.00	1.05	1.19	1.14	0.89
time (sec)	N/A	0.236	0.004	0.078	0.196	0.316	0.403	0.303	0.383

Problem 177	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	48	49	69	58	57	69	66	69	51
N.S.	1	1.02	1.44	1.21	1.19	1.44	1.38	1.44	1.06
time (sec)	N/A	0.218	0.005	0.245	0.193	0.303	0.676	0.285	0.345

Problem 178	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	48	49	69	58	57	69	66	69	51
N.S.	1	1.02	1.44	1.21	1.19	1.44	1.38	1.44	1.06
time (sec)	N/A	0.219	0.004	0.157	0.198	0.274	0.330	0.302	0.344

Problem 179	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	48	48	55	50	49	61	56	58	43
N.S.	1	1.00	1.15	1.04	1.02	1.27	1.17	1.21	0.90
time (sec)	N/A	0.203	0.002	0.074	0.194	0.311	0.181	0.336	0.327

Problem 180	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	44	43	49	50	49	58	46	54	51
N.S.	1	0.98	1.11	1.14	1.11	1.32	1.05	1.23	1.16
time (sec)	N/A	0.218	0.003	0.061	0.192	0.289	0.174	0.293	0.346

Problem 181	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	53	56	63	53	57	59	58	65	51
N.S.	1	1.06	1.19	1.00	1.08	1.11	1.09	1.23	0.96
time (sec)	N/A	0.227	0.005	0.066	0.199	0.285	0.317	0.415	0.362

Problem 182	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	57	60	69	54	57	63	68	67	53
N.S.	1	1.05	1.21	0.95	1.00	1.11	1.19	1.18	0.93
time (sec)	N/A	0.230	0.005	0.078	0.217	0.321	0.517	0.309	0.370

Problem 183	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	74	75	84	101	100	118	116	123	82
N.S.	1	1.01	1.14	1.36	1.35	1.59	1.57	1.66	1.11
time (sec)	N/A	0.285	0.029	1.366	0.199	0.294	1.688	0.366	0.386

Problem 184	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	74	75	87	101	100	118	116	123	82
N.S.	1	1.01	1.18	1.36	1.35	1.59	1.57	1.66	1.11
time (sec)	N/A	0.295	0.029	0.787	0.198	0.284	0.873	0.328	0.369

Problem 185	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	76	75	85	101	100	116	116	123	82
N.S.	1	0.99	1.12	1.33	1.32	1.53	1.53	1.62	1.08
time (sec)	N/A	0.251	0.027	0.721	0.200	0.305	0.477	0.367	0.367

Problem 186	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	89	88	82	103	88	104	133	100	80
N.S.	1	0.99	0.92	1.16	0.99	1.17	1.49	1.12	0.90
time (sec)	N/A	0.277	0.034	0.544	0.216	0.290	0.469	0.332	0.344

Problem 187	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	91	92	83	104	91	108	139	106	110
N.S.	1	1.01	0.91	1.14	1.00	1.19	1.53	1.16	1.21
time (sec)	N/A	0.324	0.043	0.512	0.203	0.296	0.555	0.297	0.366

Problem 188	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	90	89	82	103	90	108	105	103	102
N.S.	1	0.99	0.91	1.14	1.00	1.20	1.17	1.14	1.13
time (sec)	N/A	0.289	0.040	0.478	0.209	0.294	1.711	0.379	0.389

Problem 189	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	74	73	95	101	100	118	121	123	82
N.S.	1	0.99	1.28	1.36	1.35	1.59	1.64	1.66	1.11
time (sec)	N/A	0.256	0.026	0.951	0.195	0.284	1.232	0.309	0.371

Problem 190	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	74	73	95	101	100	118	121	123	82
N.S.	1	0.99	1.28	1.36	1.35	1.59	1.64	1.66	1.11
time (sec)	N/A	0.262	0.027	0.544	0.198	0.311	0.663	0.359	0.362

Problem 191	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	86	84	89	93	92	112	110	112	74
N.S.	1	0.98	1.03	1.08	1.07	1.30	1.28	1.30	0.86
time (sec)	N/A	0.243	0.025	0.448	0.210	0.291	0.344	0.420	0.347

Problem 192	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	83	81	86	96	94	109	100	103	102
N.S.	1	0.98	1.04	1.16	1.13	1.31	1.20	1.24	1.23
time (sec)	N/A	0.269	0.026	0.782	0.199	0.293	0.338	0.329	0.371

Problem 193	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	82	80	80	96	92	110	100	112	90
N.S.	1	0.98	0.98	1.17	1.12	1.34	1.22	1.37	1.10
time (sec)	N/A	0.259	0.030	0.473	0.186	0.323	0.406	0.287	0.390

Problem 194	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	91	92	86	97	100	111	112	119	88
N.S.	1	1.01	0.95	1.07	1.10	1.22	1.23	1.31	0.97
time (sec)	N/A	0.291	0.031	0.481	0.197	0.288	0.567	0.310	0.387

Problem 195	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	95	96	95	97	100	112	122	119	89
N.S.	1	1.01	1.00	1.02	1.05	1.18	1.28	1.25	0.94
time (sec)	N/A	0.307	0.035	0.474	0.190	0.313	0.954	0.343	0.409

Problem 196	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	100	99	120	144	143	167	175	177	113
N.S.	1	0.99	1.20	1.44	1.43	1.67	1.75	1.77	1.13
time (sec)	N/A	0.343	0.039	9.546	0.193	0.286	2.960	0.314	0.376

Problem 197	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	130	120	120	144	143	167	170	177	113
N.S.	1	0.92	0.92	1.11	1.10	1.28	1.31	1.36	0.87
time (sec)	N/A	0.330	0.043	1.320	0.198	0.328	1.726	0.311	0.368

Problem 198	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	A	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	91	86	118	144	143	165	170	177	113
N.S.	1	0.95	1.30	1.58	1.57	1.81	1.87	1.95	1.24
time (sec)	N/A	0.261	0.040	0.731	0.192	0.325	0.909	0.381	0.359

Problem 199	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	130	127	116	150	133	155	212	149	112
N.S.	1	0.98	0.89	1.15	1.02	1.19	1.63	1.15	0.86
time (sec)	N/A	0.318	0.047	0.725	0.188	0.287	0.939	0.336	0.385

Problem 200	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	131	124	115	149	133	155	209	156	163
N.S.	1	0.95	0.88	1.14	1.02	1.18	1.60	1.19	1.24
time (sec)	N/A	0.377	0.060	0.747	0.194	0.321	1.005	0.331	0.403

Problem 201	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	131	124	115	149	133	157	209	154	149
N.S.	1	0.95	0.88	1.14	1.02	1.20	1.60	1.18	1.14
time (sec)	N/A	0.379	0.056	0.898	0.190	0.293	1.040	0.324	0.405

Problem 202	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	100	97	133	144	143	167	170	177	113
N.S.	1	0.97	1.33	1.44	1.43	1.67	1.70	1.77	1.13
time (sec)	N/A	0.283	0.035	1.369	0.194	0.330	2.277	0.310	0.376

Problem 203	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	100	97	133	144	143	167	175	177	113
N.S.	1	0.97	1.33	1.44	1.43	1.67	1.75	1.77	1.13
time (sec)	N/A	0.285	0.036	0.809	0.203	0.308	1.248	0.326	0.390

Problem 204	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	121	117	124	134	133	161	156	163	104
N.S.	1	0.97	1.02	1.11	1.10	1.33	1.29	1.35	0.86
time (sec)	N/A	0.275	0.035	0.631	0.197	0.287	0.678	0.324	0.341

Problem 205	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	118	114	123	140	135	159	146	151	145
N.S.	1	0.97	1.04	1.19	1.14	1.35	1.24	1.28	1.23
time (sec)	N/A	0.301	0.041	0.675	0.189	0.298	0.633	0.343	0.384

Problem 206	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	121	120	112	138	137	156	155	159	141
N.S.	1	0.99	0.93	1.14	1.13	1.29	1.28	1.31	1.17
time (sec)	N/A	0.313	0.041	0.651	0.194	0.282	0.710	0.371	0.410

Problem 207	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	118	114	115	140	135	160	146	165	125
N.S.	1	0.97	0.97	1.19	1.14	1.36	1.24	1.40	1.06
time (sec)	N/A	0.296	0.040	0.673	0.197	0.309	0.690	0.372	0.434

Problem 208	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	127	126	127	140	143	160	158	171	123
N.S.	1	0.99	1.00	1.10	1.13	1.26	1.24	1.35	0.97
time (sec)	N/A	0.353	0.048	0.684	0.188	0.287	0.962	0.354	0.429

Problem 209	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	133	130	133	140	143	161	177	171	125
N.S.	1	0.98	1.00	1.05	1.08	1.21	1.33	1.29	0.94
time (sec)	N/A	0.349	0.045	0.674	0.195	0.331	1.750	0.423	0.444

Problem 210	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	121	121	174	343	0	0	257	0	0
N.S.	1	1.00	1.44	2.83	0.00	0.00	2.12	0.00	0.00
time (sec)	N/A	0.366	0.081	0.618	0.000	0.000	35.173	0.000	0.000

Problem 211	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	83	83	135	284	0	0	202	0	0
N.S.	1	1.00	1.63	3.42	0.00	0.00	2.43	0.00	0.00
time (sec)	N/A	0.322	0.051	0.439	0.000	0.000	17.419	0.000	0.000

Problem 212	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	49	49	94	244	0	0	141	0	0
N.S.	1	1.00	1.92	4.98	0.00	0.00	2.88	0.00	0.00
time (sec)	N/A	0.225	0.025	0.396	0.000	0.000	3.269	0.000	0.000

Problem 213	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	49	49	126	274	0	0	144	0	0
N.S.	1	1.00	2.57	5.59	0.00	0.00	2.94	0.00	0.00
time (sec)	N/A	0.243	0.059	0.416	0.000	0.000	5.995	0.000	0.000

Problem 214	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	83	87	157	317	0	0	0	0	0
N.S.	1	1.05	1.89	3.82	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.407	0.078	0.487	0.000	0.000	0.000	0.000	0.000

Problem 215	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	121	125	196	369	0	0	0	0	0
N.S.	1	1.03	1.62	3.05	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.610	0.128	0.636	0.000	0.000	0.000	0.000	0.000

Problem 216	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	167	167	208	365	0	0	0	0	0
N.S.	1	1.00	1.25	2.19	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.367	0.102	0.493	0.000	0.000	0.000	0.000	0.000

Problem 217	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	132	132	170	317	0	0	0	0	0
N.S.	1	1.00	1.29	2.40	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.333	0.072	0.414	0.000	0.000	0.000	0.000	0.000

Problem 218	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	105	96	107	263	0	0	0	0	0
N.S.	1	0.91	1.02	2.50	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.296	0.032	0.403	0.000	0.000	0.000	0.000	0.000

Problem 219	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	134	130	173	325	0	0	0	0	0
N.S.	1	0.97	1.29	2.43	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.452	0.098	0.457	0.000	0.000	0.000	0.000	0.000

Problem 220	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	165	168	211	369	0	0	0	0	0
N.S.	1	1.02	1.28	2.24	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.659	0.134	0.555	0.000	0.000	0.000	0.000	0.000

Problem 221	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	129	129	287	351	0	0	316	0	0
N.S.	1	1.00	2.22	2.72	0.00	0.00	2.45	0.00	0.00
time (sec)	N/A	0.399	0.351	0.542	0.000	0.000	44.054	0.000	0.000

Problem 222	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	95	95	321	305	0	0	0	0	0
N.S.	1	1.00	3.38	3.21	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.362	0.147	0.471	0.000	0.000	0.000	0.000	0.000

Problem 223	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	50	50	74	74	71	61	292	71	73
N.S.	1	1.00	1.48	1.48	1.42	1.22	5.84	1.42	1.46
time (sec)	N/A	0.201	0.056	0.427	0.193	0.340	23.119	0.314	0.392

Problem 224	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	C	F	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	82	90	279	338	0	0	0	0	0
N.S.	1	1.10	3.40	4.12	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.360	0.259	0.589	0.000	0.000	0.000	0.000	0.000

Problem 225	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	126	133	334	380	0	0	364	0	0
N.S.	1	1.06	2.65	3.02	0.00	0.00	2.89	0.00	0.00
time (sec)	N/A	0.585	0.346	0.687	0.000	0.000	157.726	0.000	0.000

Problem 226	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	191	191	296	559	0	0	0	0	0
N.S.	1	1.00	1.55	2.93	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.446	0.361	0.524	0.000	0.000	0.000	0.000	0.000

Problem 227	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	164	164	258	516	0	0	0	0	0
N.S.	1	1.00	1.57	3.15	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.411	0.328	0.487	0.000	0.000	0.000	0.000	0.000

Problem 228	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	164	160	289	449	0	0	0	0	0
N.S.	1	0.98	1.76	2.74	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.405	0.332	0.523	0.000	0.000	0.000	0.000	0.000

Problem 229	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	183	181	328	568	0	0	0	0	0
N.S.	1	0.99	1.79	3.10	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.632	0.481	0.601	0.000	0.000	0.000	0.000	0.000

Problem 230	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	224	226	361	622	0	0	0	0	0
N.S.	1	1.01	1.61	2.78	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.919	0.445	0.859	0.000	0.000	0.000	0.000	0.000

Problem 231	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	152	152	498	359	0	0	403	0	0
N.S.	1	1.00	3.28	2.36	0.00	0.00	2.65	0.00	0.00
time (sec)	N/A	0.480	0.346	0.704	0.000	0.000	63.335	0.000	0.000

Problem 232	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	B	B	B	B	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	68	66	129	130	128	126	612	140	129
N.S.	1	0.97	1.90	1.91	1.88	1.85	9.00	2.06	1.90
time (sec)	N/A	0.262	0.082	0.624	0.197	0.329	167.209	0.297	0.443

Problem 233	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	82	71	111	143	109	118	619	116	109
N.S.	1	0.87	1.35	1.74	1.33	1.44	7.55	1.41	1.33
time (sec)	N/A	0.251	0.058	0.563	0.199	0.290	169.103	0.337	0.407

Problem 234	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	115	125	396	390	0	0	403	0	0
N.S.	1	1.09	3.44	3.39	0.00	0.00	3.50	0.00	0.00
time (sec)	N/A	0.490	0.610	1.071	0.000	0.000	119.755	0.000	0.000

Problem 235	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	C	F	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	162	175	507	440	0	0	0	0	0
N.S.	1	1.08	3.13	2.72	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.761	0.726	1.178	0.000	0.000	0.000	0.000	0.000

Problem 236	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	211	211	495	900	0	0	0	0	0
N.S.	1	1.00	2.35	4.27	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.563	0.766	0.694	0.000	0.000	0.000	0.000	0.000

Problem 237	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	187	187	497	826	0	0	0	0	0
N.S.	1	1.00	2.66	4.42	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.507	0.605	0.651	0.000	0.000	0.000	0.000	0.000

Problem 238	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	210	249	544	664	0	0	0	0	0
N.S.	1	1.19	2.59	3.16	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.559	0.590	0.627	0.000	0.000	0.000	0.000	0.000

Problem 239	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	219	225	552	964	0	0	0	0	0
N.S.	1	1.03	2.52	4.40	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.805	0.943	1.005	0.000	0.000	0.000	0.000	0.000

Problem 240	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	C	F(-2)	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	260	270	584	1029	0	0	0	0	0
N.S.	1	1.04	2.25	3.96	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.108	1.035	1.386	0.000	0.000	0.000	0.000	0.000

Problem 241	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	C	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	17	17	12	76	14	94	0	11
N.S.	1	1.00	1.00	0.71	4.47	0.82	5.53	0.00	0.65
time (sec)	N/A	0.198	0.008	0.438	0.180	0.299	4.078	0.000	0.302

Problem 242	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	B	A	A	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	16	17	53	58	13	117	0	10
N.S.	1	1.00	1.06	3.31	3.62	0.81	7.31	0.00	0.62
time (sec)	N/A	0.203	0.005	0.400	0.192	0.311	2.838	0.000	0.296

Problem 243	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	F	C	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	22	22	31	20	48	0	85	0	18
N.S.	1	1.00	1.41	0.91	2.18	0.00	3.86	0.00	0.82
time (sec)	N/A	0.208	0.006	0.361	0.194	0.000	5.443	0.000	0.042

Problem 244	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	C	A	F	F	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	32	65	26	26	0	0	0	24
N.S.	1	1.00	2.03	0.81	0.81	0.00	0.00	0.00	0.75
time (sec)	N/A	0.229	0.008	0.615	0.300	0.000	0.000	0.000	0.276

Problem 245	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	62	59	68	53	0	0	0	0	0
N.S.	1	0.95	1.10	0.85	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.239	0.023	0.625	0.000	0.000	0.000	0.000	0.000

Problem 246	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	66	62	72	55	0	0	0	0	0
N.S.	1	0.94	1.09	0.83	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.241	0.022	0.681	0.000	0.000	0.000	0.000	0.000

Problem 247	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	509	509	432	0	0	0	0	0	0
N.S.	1	1.00	0.85	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.852	0.490	0.000	0.000	0.000	0.000	0.000	0.000

Problem 248	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	711	711	1073	0	0	0	0	0	0
N.S.	1	1.00	1.51	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.100	2.912	0.000	0.000	0.000	0.000	0.000	0.000

Problem 249	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	22	22	24	22	24	55	20	24	24
N.S.	1	1.00	1.09	1.00	1.09	2.50	0.91	1.09	1.09
time (sec)	N/A	0.181	2.379	0.004	0.227	0.298	77.409	0.322	0.312

Problem 250	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	22	22	24	22	261	102	1	24	24
N.S.	1	1.00	1.09	1.00	11.86	4.64	0.05	1.09	1.09
time (sec)	N/A	0.180	10.338	0.018	0.229	0.278	0.000	0.312	0.350

Problem 251	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	A	F(-1)
verified	N/A	No	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	208	180	251	0	0	414	490	288	0
N.S.	1	0.87	1.21	0.00	0.00	1.99	2.36	1.38	0.00
time (sec)	N/A	0.497	0.132	0.000	0.000	0.337	20.885	0.377	0.000

Problem 252	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	A	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	154	143	204	0	0	309	343	215	0
N.S.	1	0.93	1.32	0.00	0.00	2.01	2.23	1.40	0.00
time (sec)	N/A	0.345	0.102	0.000	0.000	0.342	14.268	0.346	0.000

Problem 253	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	A	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	102	95	136	0	0	202	218	141	0
N.S.	1	0.93	1.33	0.00	0.00	1.98	2.14	1.38	0.00
time (sec)	N/A	0.252	0.071	0.000	0.000	0.325	11.605	0.336	0.000

Problem 254	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	220	213	203	0	0	0	0	0	0
N.S.	1	0.97	0.92	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.582	0.215	0.000	0.000	0.000	0.000	0.000	0.000

Problem 255	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	252	247	303	0	0	0	0	0	0
N.S.	1	0.98	1.20	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.662	0.302	0.000	0.000	0.000	0.000	0.000	0.000

Problem 256	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	469	373	276	0	0	0	0	0	0
N.S.	1	0.80	0.59	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.855	0.381	0.000	0.000	0.000	0.000	0.000	0.000

Problem 257	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	409	317	250	0	0	0	0	0	0
N.S.	1	0.78	0.61	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.652	0.271	0.000	0.000	0.000	0.000	0.000	0.000

Problem 258	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	330	249	237	0	0	0	0	0	0
N.S.	1	0.75	0.72	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.826	0.230	0.000	0.000	0.000	0.000	0.000	0.000

Problem 259	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	345	246	183	0	0	0	0	0	0
N.S.	1	0.71	0.53	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.646	0.331	0.000	0.000	0.000	0.000	0.000	0.000

Problem 260	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	112	104	99	0	0	212	0	0	0
N.S.	1	0.93	0.88	0.00	0.00	1.89	0.00	0.00	0.00
time (sec)	N/A	0.280	0.105	0.000	0.000	0.343	0.000	0.000	0.000

Problem 261	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	170	158	145	0	0	323	0	0	0
N.S.	1	0.93	0.85	0.00	0.00	1.90	0.00	0.00	0.00
time (sec)	N/A	0.346	0.131	0.000	0.000	0.348	0.000	0.000	0.000

Problem 262	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	230	217	180	0	0	426	0	0	0
N.S.	1	0.94	0.78	0.00	0.00	1.85	0.00	0.00	0.00
time (sec)	N/A	0.429	0.162	0.000	0.000	0.378	0.000	0.000	0.000

Problem 263	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	F(-1)
verified	N/A	No	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	231	193	256	0	0	514	1161	0	0
N.S.	1	0.84	1.11	0.00	0.00	2.23	5.03	0.00	0.00
time (sec)	N/A	0.516	0.224	0.000	0.000	0.370	95.554	0.000	0.000

Problem 264	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	177	161	227	0	0	409	845	0	0
N.S.	1	0.91	1.28	0.00	0.00	2.31	4.77	0.00	0.00
time (sec)	N/A	0.369	0.132	0.000	0.000	0.361	48.939	0.000	0.000

Problem 265	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	125	113	181	0	0	304	573	0	0
N.S.	1	0.90	1.45	0.00	0.00	2.43	4.58	0.00	0.00
time (sec)	N/A	0.273	0.096	0.000	0.000	0.359	30.638	0.000	0.000

Problem 266	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	260	252	301	0	0	0	0	0	0
N.S.	1	0.97	1.16	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.656	0.496	0.000	0.000	0.000	0.000	0.000	0.000

Problem 267	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	295	288	349	0	0	0	0	0	0
N.S.	1	0.98	1.18	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.747	0.588	0.000	0.000	0.000	0.000	0.000	0.000

Problem 268	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	464	371	331	0	0	0	0	0	0
N.S.	1	0.80	0.71	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.882	0.630	0.000	0.000	0.000	0.000	0.000	0.000

Problem 269	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	C	F	F(-2)	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	378	355	314	0	0	0	0	0	0
N.S.	1	0.94	0.83	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.118	0.547	0.000	0.000	0.000	0.000	0.000	0.000

Problem 270	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	400	313	329	0	0	0	0	0	0
N.S.	1	0.78	0.82	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.734	0.628	0.000	0.000	0.000	0.000	0.000	0.000

Problem 271	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	400	312	269	0	0	0	0	0	0
N.S.	1	0.78	0.67	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.685	0.497	0.000	0.000	0.000	0.000	0.000	0.000

Problem 272	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	138	125	114	0	0	314	0	0	0
N.S.	1	0.91	0.83	0.00	0.00	2.28	0.00	0.00	0.00
time (sec)	N/A	0.309	0.153	0.000	0.000	0.358	0.000	0.000	0.000

Problem 273	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	196	179	145	0	0	423	0	0	0
N.S.	1	0.91	0.74	0.00	0.00	2.16	0.00	0.00	0.00
time (sec)	N/A	0.363	0.193	0.000	0.000	0.393	0.000	0.000	0.000

Problem 274	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	256	238	178	0	0	526	0	0	0
N.S.	1	0.93	0.70	0.00	0.00	2.05	0.00	0.00	0.00
time (sec)	N/A	0.480	0.224	0.000	0.000	0.408	0.000	0.000	0.000

Problem 275	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	60	64	53	75	39	54	71	54	0
N.S.	1	1.07	0.88	1.25	0.65	0.90	1.18	0.90	0.00
time (sec)	N/A	0.203	0.032	0.440	0.257	0.318	7.761	0.339	0.000

Problem 276	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	F(-1)
verified	N/A	No	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	182	164	204	0	0	314	359	0	0
N.S.	1	0.90	1.12	0.00	0.00	1.73	1.97	0.00	0.00
time (sec)	N/A	0.507	0.150	0.000	0.000	0.344	17.139	0.000	0.000

Problem 277	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	129	123	145	0	0	207	236	0	0
N.S.	1	0.95	1.12	0.00	0.00	1.60	1.83	0.00	0.00
time (sec)	N/A	0.346	0.119	0.000	0.000	0.320	12.282	0.000	0.000

Problem 278	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	73	74	91	0	0	124	129	0	0
N.S.	1	1.01	1.25	0.00	0.00	1.70	1.77	0.00	0.00
time (sec)	N/A	0.247	0.074	0.000	0.000	0.322	2.166	0.000	0.000

Problem 279	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	166	154	162	0	0	0	0	0	0
N.S.	1	0.93	0.98	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.761	0.127	0.000	0.000	0.000	0.000	0.000	0.000

Problem 280	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	258	252	229	0	0	0	0	0	0
N.S.	1	0.98	0.89	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.675	0.667	0.000	0.000	0.000	0.000	0.000	0.000

Problem 281	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	359	263	205	0	0	0	0	0	0
N.S.	1	0.73	0.57	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.667	0.506	0.000	0.000	0.000	0.000	0.000	0.000

Problem 282	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	C	A	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	250	166	186	0	0	0	0	0	0
N.S.	1	0.66	0.74	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.569	0.360	0.000	0.000	0.000	0.000	0.000	0.000

Problem 283	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	81	78	77	0	0	127	0	0	0
N.S.	1	0.96	0.95	0.00	0.00	1.57	0.00	0.00	0.00
time (sec)	N/A	0.270	0.073	0.000	0.000	0.360	0.000	0.000	0.000

Problem 284	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	144	137	110	0	0	223	0	0	0
N.S.	1	0.95	0.76	0.00	0.00	1.55	0.00	0.00	0.00
time (sec)	N/A	0.318	0.102	0.000	0.000	0.362	0.000	0.000	0.000

Problem 285	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	204	196	147	0	0	326	0	0	0
N.S.	1	0.96	0.72	0.00	0.00	1.60	0.00	0.00	0.00
time (sec)	N/A	0.405	0.166	0.000	0.000	0.347	0.000	0.000	0.000

Problem 286	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	209	195	195	0	0	461	374	0	0
N.S.	1	0.93	0.93	0.00	0.00	2.21	1.79	0.00	0.00
time (sec)	N/A	0.633	0.165	0.000	0.000	0.377	44.806	0.000	0.000

Problem 287	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	F(-1)
verified	N/A	No	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	158	150	160	0	0	356	308	0	0
N.S.	1	0.95	1.01	0.00	0.00	2.25	1.95	0.00	0.00
time (sec)	N/A	0.484	0.140	0.000	0.000	0.340	37.361	0.000	0.000

Problem 288	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	100	100	118	0	0	245	167	0	0
N.S.	1	1.00	1.18	0.00	0.00	2.45	1.67	0.00	0.00
time (sec)	N/A	0.340	0.120	0.000	0.000	0.304	24.360	0.000	0.000

Problem 289	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	57	57	77	0	0	169	94	0	0
N.S.	1	1.00	1.35	0.00	0.00	2.96	1.65	0.00	0.00
time (sec)	N/A	0.252	0.110	0.000	0.000	0.325	4.625	0.000	0.000

Problem 290	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	209	206	241	0	0	0	0	0	0
N.S.	1	0.99	1.15	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.602	0.258	0.000	0.000	0.000	0.000	0.000	0.000

Problem 291	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	287	282	218	0	0	0	0	0	0
N.S.	1	0.98	0.76	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.673	0.214	0.000	0.000	0.000	0.000	0.000	0.000

Problem 292	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	328	232	217	0	0	0	0	0	0
N.S.	1	0.71	0.66	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.732	0.324	0.000	0.000	0.000	0.000	0.000	0.000

Problem 293	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	58	58	70	0	0	172	0	0	0
N.S.	1	1.00	1.21	0.00	0.00	2.97	0.00	0.00	0.00
time (sec)	N/A	0.197	0.070	0.000	0.000	0.331	0.000	0.000	0.000

Problem 294	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	110	107	103	0	0	241	0	0	0
N.S.	1	0.97	0.94	0.00	0.00	2.19	0.00	0.00	0.00
time (sec)	N/A	0.316	0.095	0.000	0.000	0.338	0.000	0.000	0.000

Problem 295	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	176	173	144	0	0	370	0	0	0
N.S.	1	0.98	0.82	0.00	0.00	2.10	0.00	0.00	0.00
time (sec)	N/A	0.401	0.112	0.000	0.000	0.377	0.000	0.000	0.000

Problem 296	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	236	242	180	0	0	473	0	0	0
N.S.	1	1.03	0.76	0.00	0.00	2.00	0.00	0.00	0.00
time (sec)	N/A	0.598	0.137	0.000	0.000	0.419	0.000	0.000	0.000

Problem 297	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	212	196	240	0	0	504	556	0	0
N.S.	1	0.92	1.13	0.00	0.00	2.38	2.62	0.00	0.00
time (sec)	N/A	0.667	0.196	0.000	0.000	0.379	104.749	0.000	0.000

Problem 298	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	F(-1)
verified	N/A	No	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	155	147	205	0	0	401	415	0	0
N.S.	1	0.95	1.32	0.00	0.00	2.59	2.68	0.00	0.00
time (sec)	N/A	0.482	0.161	0.000	0.000	0.364	65.068	0.000	0.000

Problem 299	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	108	104	137	0	137	325	337	0	0
N.S.	1	0.96	1.27	0.00	1.27	3.01	3.12	0.00	0.00
time (sec)	N/A	0.328	0.194	0.000	0.271	0.348	28.707	0.000	0.000

Problem 300	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	A	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	84	80	97	0	0	267	272	0	0
N.S.	1	0.95	1.15	0.00	0.00	3.18	3.24	0.00	0.00
time (sec)	N/A	0.245	0.168	0.000	0.000	0.337	13.693	0.000	0.000

Problem 301	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	251	245	273	0	0	0	0	0	0
N.S.	1	0.98	1.09	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.653	0.308	0.000	0.000	0.000	0.000	0.000	0.000

Problem 302	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	337	330	227	0	0	0	0	0	0
N.S.	1	0.98	0.67	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.748	0.185	0.000	0.000	0.000	0.000	0.000	0.000

Problem 303	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	443	367	199	0	0	0	0	0	0
N.S.	1	0.83	0.45	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.773	0.212	0.000	0.000	0.000	0.000	0.000	0.000

Problem 304	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	383	297	244	0	0	0	0	0	0
N.S.	1	0.78	0.64	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.746	0.593	0.000	0.000	0.000	0.000	0.000	0.000

Problem 305	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	89	84	101	0	0	277	0	0	0
N.S.	1	0.94	1.13	0.00	0.00	3.11	0.00	0.00	0.00
time (sec)	N/A	0.271	0.130	0.000	0.000	0.330	0.000	0.000	0.000

Problem 306	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	113	116	116	0	0	337	0	0	0
N.S.	1	1.03	1.03	0.00	0.00	2.98	0.00	0.00	0.00
time (sec)	N/A	0.283	0.102	0.000	0.000	0.330	0.000	0.000	0.000

Problem 307	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	166	161	144	0	0	399	0	0	0
N.S.	1	0.97	0.87	0.00	0.00	2.40	0.00	0.00	0.00
time (sec)	N/A	0.383	0.127	0.000	0.000	0.375	0.000	0.000	0.000

Problem 308	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	A	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	230	228	182	0	0	520	0	0	0
N.S.	1	0.99	0.79	0.00	0.00	2.26	0.00	0.00	0.00
time (sec)	N/A	0.567	0.147	0.000	0.000	0.380	0.000	0.000	0.000

Problem 309	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	251	192	163	0	199	125	0	0	0
N.S.	1	0.76	0.65	0.00	0.79	0.50	0.00	0.00	0.00
time (sec)	N/A	0.699	0.298	0.000	0.262	0.330	0.000	0.000	0.000

Problem 310	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	148	125	113	0	105	66	0	0	0
N.S.	1	0.84	0.76	0.00	0.71	0.45	0.00	0.00	0.00
time (sec)	N/A	0.496	0.147	0.000	0.300	0.300	0.000	0.000	0.000

Problem 311	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	301	175	310	0	0	0	0	0	0
N.S.	1	0.58	1.03	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.102	1.204	0.000	0.000	0.000	0.000	0.000	0.000

Problem 312	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	F	F	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	489	307	255	0	0	0	0	0	0
N.S.	1	0.63	0.52	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.998	0.636	0.000	0.000	0.000	0.000	0.000	0.000

Problem 313	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	406	217	316	0	0	0	0	0	0
N.S.	1	0.53	0.78	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.822	1.882	0.000	0.000	0.000	0.000	0.000	0.000

Problem 314	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	248	139	217	0	0	0	0	0	0
N.S.	1	0.56	0.88	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.643	0.381	0.000	0.000	0.000	0.000	0.000	0.000

Problem 315	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	142	109	70	0	102	73	0	0	0
N.S.	1	0.77	0.49	0.00	0.72	0.51	0.00	0.00	0.00
time (sec)	N/A	0.565	0.160	0.000	0.262	0.300	0.000	0.000	0.000

Problem 316	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	252	190	116	0	0	135	0	0	0
N.S.	1	0.75	0.46	0.00	0.00	0.54	0.00	0.00	0.00
time (sec)	N/A	0.656	0.210	0.000	0.000	0.316	0.000	0.000	0.000

Problem 317	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	34	41	27	119	27	27	29	28	0
N.S.	1	1.21	0.79	3.50	0.79	0.79	0.85	0.82	0.00
time (sec)	N/A	0.194	0.018	0.425	0.260	0.283	1.214	0.349	0.000

Problem 318	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	211	206	156	1761	271	1222	6217	558	0
N.S.	1	0.98	0.74	8.35	1.28	5.79	29.46	2.64	0.00
time (sec)	N/A	1.437	0.167	27.451	0.206	0.302	13.507	0.377	0.000

Problem 319	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	153	183	112	916	195	633	2820	396	0
N.S.	1	1.20	0.73	5.99	1.27	4.14	18.43	2.59	0.00
time (sec)	N/A	0.453	0.100	5.717	0.195	0.299	5.452	0.368	0.000

Problem 320	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	95	94	68	343	119	235	920	234	0
N.S.	1	0.99	0.72	3.61	1.25	2.47	9.68	2.46	0.00
time (sec)	N/A	0.291	0.054	0.901	0.190	0.292	2.709	0.343	0.000

Problem 321	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	46	46	32	68	57	52	141	95	0
N.S.	1	1.00	0.70	1.48	1.24	1.13	3.07	2.07	0.00
time (sec)	N/A	0.174	0.008	0.004	0.185	0.289	2.176	0.331	0.000

Problem 322	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	25	25	108	25	27	33	22	27	27
N.S.	1	1.00	4.32	1.00	1.08	1.32	0.88	1.08	1.08
time (sec)	N/A	0.217	0.704	0.030	0.217	0.285	7.106	0.379	0.412

Problem 323	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	25	25	108	25	27	44	24	27	27
N.S.	1	1.00	4.32	1.00	1.08	1.76	0.96	1.08	1.08
time (sec)	N/A	0.212	0.137	0.044	0.221	0.283	162.221	0.419	0.451

Problem 324	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	1198	1198	2215	0	0	0	0	0	0
N.S.	1	1.00	1.85	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.785	7.313	0.000	0.000	0.000	0.000	0.000	0.000

Problem 325	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	860	860	1180	0	0	0	0	0	0
N.S.	1	1.00	1.37	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.154	2.720	0.000	0.000	0.000	0.000	0.000	0.000

Problem 326	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	520	520	571	598	0	0	0	0	0
N.S.	1	1.00	1.10	1.15	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.776	0.831	1.131	0.000	0.000	0.000	0.000	0.000

Problem 327	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	22	22	24	22	24	55	1	24	24
N.S.	1	1.00	1.09	1.00	1.09	2.50	0.05	1.09	1.09
time (sec)	N/A	0.182	3.846	0.006	0.216	0.261	0.000	0.310	0.349

Problem 328	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	22	22	24	22	261	102	1	24	24
N.S.	1	1.00	1.09	1.00	11.86	4.64	0.05	1.09	1.09
time (sec)	N/A	0.186	17.202	0.035	0.228	0.276	0.000	0.327	0.391

Problem 329	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	185	185	171	313	0	0	316	0	0
N.S.	1	1.00	0.92	1.69	0.00	0.00	1.71	0.00	0.00
time (sec)	N/A	0.425	0.070	0.338	0.000	0.000	75.860	0.000	0.000

Problem 330	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	148	148	142	272	0	0	267	0	0
N.S.	1	1.00	0.96	1.84	0.00	0.00	1.80	0.00	0.00
time (sec)	N/A	0.376	0.049	0.180	0.000	0.000	80.120	0.000	0.000

Problem 331	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	107	107	105	233	0	0	218	0	0
N.S.	1	1.00	0.98	2.18	0.00	0.00	2.04	0.00	0.00
time (sec)	N/A	0.329	0.036	0.127	0.000	0.000	53.551	0.000	0.000

Problem 332	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	69	69	66	188	0	0	163	0	0
N.S.	1	1.00	0.96	2.72	0.00	0.00	2.36	0.00	0.00
time (sec)	N/A	0.252	0.023	0.109	0.000	0.000	42.526	0.000	0.000

Problem 333	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	39	39	37	151	0	0	0	0	0
N.S.	1	1.00	0.95	3.87	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.228	0.006	0.076	0.000	0.000	0.000	0.000	0.000

Problem 334	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	C	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	44	44	63	181	0	0	173	0	0
N.S.	1	1.00	1.43	4.11	0.00	0.00	3.93	0.00	0.00
time (sec)	N/A	0.255	0.025	0.095	0.000	0.000	6.043	0.000	0.000

Problem 335	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	95	78	88	221	0	0	216	0	0
N.S.	1	0.82	0.93	2.33	0.00	0.00	2.27	0.00	0.00
time (sec)	N/A	0.416	0.057	0.128	0.000	0.000	37.151	0.000	0.000

Problem 336	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	135	116	124	264	0	0	265	0	0
N.S.	1	0.86	0.92	1.96	0.00	0.00	1.96	0.00	0.00
time (sec)	N/A	0.597	0.133	0.184	0.000	0.000	42.968	0.000	0.000

Problem 337	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	170	170	156	204	210	0	299	0	0
N.S.	1	1.00	0.92	1.20	1.24	0.00	1.76	0.00	0.00
time (sec)	N/A	0.391	0.056	0.127	0.243	0.000	82.828	0.000	0.000

Problem 338	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	136	136	125	168	164	0	253	0	0
N.S.	1	1.00	0.92	1.24	1.21	0.00	1.86	0.00	0.00
time (sec)	N/A	0.360	0.044	0.049	0.226	0.000	79.519	0.000	0.000

Problem 339	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	98	98	99	126	112	0	207	0	0
N.S.	1	1.00	1.01	1.29	1.14	0.00	2.11	0.00	0.00
time (sec)	N/A	0.311	0.028	0.036	0.238	0.000	52.730	0.000	0.000

Problem 340	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	63	63	64	88	69	0	156	0	0
N.S.	1	1.00	1.02	1.40	1.10	0.00	2.48	0.00	0.00
time (sec)	N/A	0.241	0.022	0.033	0.232	0.000	43.429	0.000	0.000

Problem 341	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	36	36	34	59	43	0	0	0	0
N.S.	1	1.00	0.94	1.64	1.19	0.00	0.00	0.00	0.00
time (sec)	N/A	0.217	0.006	0.027	0.246	0.000	0.000	0.000	0.000

Problem 342	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	F	C	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	41	41	54	81	67	0	170	0	0
N.S.	1	1.00	1.32	1.98	1.63	0.00	4.15	0.00	0.00
time (sec)	N/A	0.243	0.018	0.042	0.217	0.000	5.953	0.000	0.000

Problem 343	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	84	72	77	115	96	0	206	0	0
N.S.	1	0.86	0.92	1.37	1.14	0.00	2.45	0.00	0.00
time (sec)	N/A	0.396	0.061	0.046	0.229	0.000	37.730	0.000	0.000

Problem 344	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	121	107	110	157	151	0	252	0	0
N.S.	1	0.88	0.91	1.30	1.25	0.00	2.08	0.00	0.00
time (sec)	N/A	0.558	0.096	0.057	0.227	0.000	42.654	0.000	0.000

Problem 345	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	F(-2)	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	17	17	14	52	39	0	0	13
N.S.	1	1.00	1.00	0.82	3.06	2.29	0.00	0.00	0.76
time (sec)	N/A	0.219	0.011	0.794	0.298	0.297	0.000	0.000	0.495

Problem 346	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	F(-2)	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	16	17	13	45	50	0	0	12
N.S.	1	1.00	1.06	0.81	2.81	3.12	0.00	0.00	0.75
time (sec)	N/A	0.220	0.010	0.480	0.301	0.303	0.000	0.000	0.397

Problem 347	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	B	F(-2)	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	20	20	21	19	64	55	0	0	18
N.S.	1	1.00	1.05	0.95	3.20	2.75	0.00	0.00	0.90
time (sec)	N/A	0.224	0.009	0.508	0.314	0.303	0.000	0.000	0.410

Problem 348	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	C	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	14	16	11	72	13	82	0	10
N.S.	1	1.00	1.14	0.79	5.14	0.93	5.86	0.00	0.71
time (sec)	N/A	0.229	0.004	0.777	0.188	0.314	4.883	0.000	0.377

Problem 349	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	B	A	C	F	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	17	17	21	12	81	14	92	0	11
N.S.	1	1.00	1.24	0.71	4.76	0.82	5.41	0.00	0.65
time (sec)	N/A	0.238	0.005	0.667	0.199	0.310	5.017	0.000	0.340

Problem 350	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	26	26	23	0	0	89	0	0	0
N.S.	1	1.00	0.88	0.00	0.00	3.42	0.00	0.00	0.00
time (sec)	N/A	0.271	0.009	0.000	0.000	0.283	0.000	0.000	0.000

Problem 351	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	171	113	140	256	253	193	333	339	0
N.S.	1	0.66	0.82	1.50	1.48	1.13	1.95	1.98	0.00
time (sec)	N/A	0.409	0.110	54.990	0.212	0.294	8.482	0.429	0.000

Problem 352	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	142	100	101	181	180	135	241	241	0
N.S.	1	0.70	0.71	1.27	1.27	0.95	1.70	1.70	0.00
time (sec)	N/A	0.393	0.079	12.181	0.199	0.286	4.897	0.422	0.000

Problem 353	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	90	85	61	105	109	76	156	146	0
N.S.	1	0.94	0.68	1.17	1.21	0.84	1.73	1.62	0.00
time (sec)	N/A	0.329	0.046	1.743	0.197	0.296	3.007	0.395	0.000

Problem 354	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	38	38	29	48	48	42	82	64	0
N.S.	1	1.00	0.76	1.26	1.26	1.11	2.16	1.68	0.00
time (sec)	N/A	0.179	0.008	0.114	0.193	0.296	2.072	0.338	0.000

Problem 355	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	A	F	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD
size	77	64	141	0	0	77	0	0	0
N.S.	1	0.83	1.83	0.00	0.00	1.00	0.00	0.00	0.00
time (sec)	N/A	0.386	0.304	0.000	0.000	0.288	0.000	0.000	0.000

Problem 356	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	69	69	89	0	97	89	0	202	0
N.S.	1	1.00	1.29	0.00	1.41	1.29	0.00	2.93	0.00
time (sec)	N/A	0.290	0.280	0.000	0.204	0.318	0.000	0.350	0.000

Problem 357	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	F	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	150	92	137	0	152	167	0	633	0
N.S.	1	0.61	0.91	0.00	1.01	1.11	0.00	4.22	0.00
time (sec)	N/A	0.403	0.275	0.000	0.205	0.314	0.000	0.362	0.000

Problem 358	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	A	A	F(-1)	B	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	188	108	178	0	210	242	0	1102	0
N.S.	1	0.57	0.95	0.00	1.12	1.29	0.00	5.86	0.00
time (sec)	N/A	0.441	0.292	0.000	0.217	0.319	0.000	0.370	0.000

Problem 359	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	372	252	285	617	578	592	760	995	0
N.S.	1	0.68	0.77	1.66	1.55	1.59	2.04	2.67	0.00
time (sec)	N/A	0.747	0.185	205.349	0.233	0.310	38.319	0.622	0.000

Problem 360	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	298	212	207	439	417	419	552	715	0
N.S.	1	0.71	0.69	1.47	1.40	1.41	1.85	2.40	0.00
time (sec)	N/A	0.725	0.147	50.855	0.234	0.315	12.604	0.523	0.000

Problem 361	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	226	163	125	261	257	244	352	435	0
N.S.	1	0.72	0.55	1.15	1.14	1.08	1.56	1.92	0.00
time (sec)	N/A	0.590	0.092	10.749	0.205	0.324	9.277	0.452	0.000

Problem 362	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	69	70	67	119	117	124	184	198	0
N.S.	1	1.01	0.97	1.72	1.70	1.80	2.67	2.87	0.00
time (sec)	N/A	0.245	0.016	0.387	0.196	0.329	6.767	0.421	0.000

Problem 363	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	F	F	A	F	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD
size	129	100	502	0	0	178	0	0	0
N.S.	1	0.78	3.89	0.00	0.00	1.38	0.00	0.00	0.00
time (sec)	N/A	0.575	0.400	0.000	0.000	0.314	0.000	0.000	0.000

Problem 364	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	A	F	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD
size	138	109	157	0	0	266	0	0	0
N.S.	1	0.79	1.14	0.00	0.00	1.93	0.00	0.00	0.00
time (sec)	N/A	0.554	0.510	0.000	0.000	0.296	0.000	0.000	0.000

Problem 365	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	B	F(-1)	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD
size	214	172	207	0	0	535	0	0	0
N.S.	1	0.80	0.97	0.00	0.00	2.50	0.00	0.00	0.00
time (sec)	N/A	0.875	0.488	0.000	0.000	0.296	0.000	0.000	0.000

Problem 366	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	B	F(-1)	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD
size	346	263	240	0	0	810	0	0	0
N.S.	1	0.76	0.69	0.00	0.00	2.34	0.00	0.00	0.00
time (sec)	N/A	1.436	0.598	0.000	0.000	0.307	0.000	0.000	0.000

Problem 367	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	59	62	73	174	76	159	398	132	0
N.S.	1	1.05	1.24	2.95	1.29	2.69	6.75	2.24	0.00
time (sec)	N/A	0.282	0.062	4.804	0.184	0.304	8.569	0.325	0.000

Problem 368	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	59	62	73	169	76	159	398	132	0
N.S.	1	1.05	1.24	2.86	1.29	2.69	6.75	2.24	0.00
time (sec)	N/A	0.273	0.059	1.324	0.195	0.313	2.856	0.324	0.000

Problem 369	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	59	62	73	174	76	159	398	132	0
N.S.	1	1.05	1.24	2.95	1.29	2.69	6.75	2.24	0.00
time (sec)	N/A	0.258	0.063	0.362	0.185	0.316	0.858	0.317	0.000

Problem 370	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	53	53	54	68	56	64	131	0	0
N.S.	1	1.00	1.02	1.28	1.06	1.21	2.47	0.00	0.00
time (sec)	N/A	0.268	0.061	0.217	0.193	0.310	2.282	0.000	0.000

Problem 371	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F(-2)	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	71	71	72	135	0	140	495	389	0
N.S.	1	1.00	1.01	1.90	0.00	1.97	6.97	5.48	0.00
time (sec)	N/A	0.272	0.076	0.224	0.000	0.314	2.037	0.338	0.000

Problem 372	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F(-2)	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	71	71	72	135	0	140	495	390	0
N.S.	1	1.00	1.01	1.90	0.00	1.97	6.97	5.49	0.00
time (sec)	N/A	0.270	0.070	0.377	0.000	0.301	3.419	0.337	0.000

Problem 373	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	59	62	73	169	76	159	398	132	0
N.S.	1	1.05	1.24	2.86	1.29	2.69	6.75	2.24	0.00
time (sec)	N/A	0.271	0.061	2.615	0.191	0.299	5.027	0.307	0.000

Problem 374	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	59	62	73	169	76	159	398	132	0
N.S.	1	1.05	1.24	2.86	1.29	2.69	6.75	2.24	0.00
time (sec)	N/A	0.282	0.059	0.697	0.187	0.305	1.509	0.344	0.000

Problem 375	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	57	64	53	144	68	138	323	110	0
N.S.	1	1.12	0.93	2.53	1.19	2.42	5.67	1.93	0.00
time (sec)	N/A	0.223	0.083	0.194	0.189	0.280	0.474	0.314	0.000

Problem 376	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F(-2)	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	67	79	67	127	0	130	348	186	0
N.S.	1	1.18	1.00	1.90	0.00	1.94	5.19	2.78	0.00
time (sec)	N/A	0.289	0.070	0.208	0.000	0.290	2.181	0.384	0.000

Problem 377	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F(-2)	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	71	71	72	135	0	140	495	390	0
N.S.	1	1.00	1.01	1.90	0.00	1.97	6.97	5.49	0.00
time (sec)	N/A	0.267	0.072	0.223	0.000	0.289	2.571	0.352	0.000

Problem 378	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F(-2)	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	71	71	72	135	0	140	495	390	0
N.S.	1	1.00	1.01	1.90	0.00	1.97	6.97	5.49	0.00
time (sec)	N/A	0.264	0.066	0.747	0.000	0.295	5.035	0.353	0.000

Problem 379	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	103	104	118	583	148	489	1634	744	0
N.S.	1	1.01	1.15	5.66	1.44	4.75	15.86	7.22	0.00
time (sec)	N/A	0.378	0.177	15.649	0.192	0.301	26.357	0.374	0.000

Problem 380	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	103	101	118	588	148	488	1625	744	0
N.S.	1	0.98	1.15	5.71	1.44	4.74	15.78	7.22	0.00
time (sec)	N/A	0.371	0.170	5.228	0.192	0.305	7.097	0.378	0.000

Problem 381	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	102	103	116	577	148	488	1622	744	0
N.S.	1	1.01	1.14	5.66	1.45	4.78	15.90	7.29	0.00
time (sec)	N/A	0.344	0.163	1.789	0.181	0.301	1.726	0.313	0.000

Problem 382	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	104	106	90	122	114	115	216	0	0
N.S.	1	1.02	0.87	1.17	1.10	1.11	2.08	0.00	0.00
time (sec)	N/A	0.362	0.136	1.444	0.326	0.293	2.439	0.000	0.000

Problem 383	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F(-2)	B	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	135	166	120	474	0	457	2118	0	0
N.S.	1	1.23	0.89	3.51	0.00	3.39	15.69	0.00	0.00
time (sec)	N/A	0.429	0.215	1.149	0.000	0.303	3.299	0.000	0.000

Problem 384	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F(-2)	B	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	135	164	121	475	0	457	2127	0	0
N.S.	1	1.21	0.90	3.52	0.00	3.39	15.76	0.00	0.00
time (sec)	N/A	0.419	0.205	1.099	0.000	0.303	4.816	0.000	0.000

Problem 385	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	F(-1)	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	105	106	124	586	152	497	0	746	0
N.S.	1	1.01	1.18	5.58	1.45	4.73	0.00	7.10	0.00
time (sec)	N/A	0.379	0.174	9.098	0.187	0.303	0.000	0.346	0.000

Problem 386	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	105	106	124	581	152	497	240	746	0
N.S.	1	1.01	1.18	5.53	1.45	4.73	2.29	7.10	0.00
time (sec)	N/A	0.385	0.173	3.028	0.185	0.282	83.393	0.366	0.000

Problem 387	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	113	110	107	509	144	466	211	244	0
N.S.	1	0.97	0.95	4.50	1.27	4.12	1.87	2.16	0.00
time (sec)	N/A	0.292	0.115	1.010	0.183	0.316	2.283	0.344	0.000

Problem 388	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F(-2)	B	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	123	121	121	471	0	455	209	0	0
N.S.	1	0.98	0.98	3.83	0.00	3.70	1.70	0.00	0.00
time (sec)	N/A	0.412	0.198	1.108	0.000	0.319	3.285	0.000	0.000

Problem 389	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F(-2)	B	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	127	128	127	478	0	466	233	0	0
N.S.	1	1.01	1.00	3.76	0.00	3.67	1.83	0.00	0.00
time (sec)	N/A	0.405	0.204	1.119	0.000	0.299	18.042	0.000	0.000

Problem 390	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F(-2)	B	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	127	128	127	478	0	466	233	0	0
N.S.	1	1.01	1.00	3.76	0.00	3.67	1.83	0.00	0.00
time (sec)	N/A	0.418	0.198	1.096	0.000	0.332	139.218	0.000	0.000

Problem 391	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F(-2)	B	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	127	128	127	473	0	466	0	0	0
N.S.	1	1.01	1.00	3.72	0.00	3.67	0.00	0.00	0.00
time (sec)	N/A	0.404	0.206	3.262	0.000	0.319	0.000	0.000	0.000

Problem 392	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	147	146	172	1249	218	1011	4100	1609	0
N.S.	1	0.99	1.17	8.50	1.48	6.88	27.89	10.95	0.00
time (sec)	N/A	0.551	0.241	40.921	0.190	0.321	92.425	0.372	0.000

Problem 393	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	F(-1)	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	149	146	178	1262	222	1022	0	1611	0
N.S.	1	0.98	1.19	8.47	1.49	6.86	0.00	10.81	0.00
time (sec)	N/A	0.588	0.240	15.464	0.186	0.338	0.000	0.476	0.000

Problem 394	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	149	148	178	1267	222	1024	357	1611	0
N.S.	1	0.99	1.19	8.50	1.49	6.87	2.40	10.81	0.00
time (sec)	N/A	0.546	0.230	5.648	0.196	0.336	86.831	0.375	0.000

Problem 395	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	152	153	132	177	172	169	299	0	0
N.S.	1	1.01	0.87	1.16	1.13	1.11	1.97	0.00	0.00
time (sec)	N/A	0.424	0.240	3.322	0.188	0.346	2.913	0.000	0.000

Problem 396	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F(-2)	B	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	191	190	181	1039	0	981	347	0	0
N.S.	1	0.99	0.95	5.44	0.00	5.14	1.82	0.00	0.00
time (sec)	N/A	0.638	0.272	3.593	0.000	0.361	46.140	0.000	0.000

Problem 397	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F(-2)	B	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	191	188	181	1039	0	980	0	0	0
N.S.	1	0.98	0.95	5.44	0.00	5.13	0.00	0.00	0.00
time (sec)	N/A	0.629	0.282	3.445	0.000	0.319	0.000	0.000	0.000

Problem 398	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	F(-1)	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	151	150	184	1269	228	1023	0	1611	0
N.S.	1	0.99	1.22	8.40	1.51	6.77	0.00	10.67	0.00
time (sec)	N/A	0.582	0.230	26.564	0.191	0.359	0.000	0.354	0.000

Problem 399	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	F(-1)	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	148	147	176	1257	224	1022	0	1611	0
N.S.	1	0.99	1.19	8.49	1.51	6.91	0.00	10.89	0.00
time (sec)	N/A	0.569	0.229	9.671	0.194	0.319	0.000	0.326	0.000

Problem 400	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	A	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	169	164	159	1108	220	983	325	379	0
N.S.	1	0.97	0.94	6.56	1.30	5.82	1.92	2.24	0.00
time (sec)	N/A	0.350	0.162	3.408	0.187	0.306	3.895	0.308	0.000

Problem 401	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F(-2)	B	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	179	175	181	1035	0	967	323	0	0
N.S.	1	0.98	1.01	5.78	0.00	5.40	1.80	0.00	0.00
time (sec)	N/A	0.612	0.254	3.769	0.000	0.311	10.764	0.000	0.000

Problem 402	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F(-2)	B	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	191	190	180	1039	0	980	347	0	0
N.S.	1	0.99	0.94	5.44	0.00	5.13	1.82	0.00	0.00
time (sec)	N/A	0.619	0.262	3.471	0.000	0.338	49.681	0.000	0.000

Problem 403	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F(-2)	B	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	183	182	187	1041	0	981	0	0	0
N.S.	1	0.99	1.02	5.69	0.00	5.36	0.00	0.00	0.00
time (sec)	N/A	0.637	0.265	3.648	0.000	0.359	0.000	0.000	0.000

Problem 404	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F(-2)	B	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	183	182	188	1041	0	981	0	0	0
N.S.	1	0.99	1.03	5.69	0.00	5.36	0.00	0.00	0.00
time (sec)	N/A	0.621	0.263	3.286	0.000	0.302	0.000	0.000	0.000

Problem 405	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F(-2)	B	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	191	188	182	1044	0	981	0	0	0
N.S.	1	0.98	0.95	5.47	0.00	5.14	0.00	0.00	0.00
time (sec)	N/A	0.628	0.271	9.999	0.000	0.292	0.000	0.000	0.000

Problem 406	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	23	23	87	23	25	29	20	25	25
N.S.	1	1.00	3.78	1.00	1.09	1.26	0.87	1.09	1.09
time (sec)	N/A	0.219	0.092	0.056	0.230	0.257	6.413	0.308	0.484

Problem 407	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	21	21	87	21	23	25	19	23	23
N.S.	1	1.00	4.14	1.00	1.10	1.19	0.90	1.10	1.10
time (sec)	N/A	0.197	0.076	0.053	0.227	0.266	2.492	0.304	0.426

Problem 408	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	A	A	F	F(-1)
verified	N/A	Yes	No	No	TBD	TBD	TBD	TBD	TBD
size	54	54	108	246	0	93	452	0	0
N.S.	1	1.00	2.00	4.56	0.00	1.72	8.37	0.00	0.00
time (sec)	N/A	0.270	0.113	0.635	0.000	0.269	149.775	0.000	0.000

Problem 409	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	23	23	86	23	25	29	20	25	25
N.S.	1	1.00	3.74	1.00	1.09	1.26	0.87	1.09	1.09
time (sec)	N/A	0.210	0.089	0.053	0.240	0.287	5.708	0.298	0.433

Problem 410	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	23	23	87	23	25	29	20	25	25
N.S.	1	1.00	3.78	1.00	1.09	1.26	0.87	1.09	1.09
time (sec)	N/A	0.214	0.084	0.060	0.243	0.296	4.023	0.345	0.477

Problem 411	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	20	20	69	20	22	22	17	22	22
N.S.	1	1.00	3.45	1.00	1.10	1.10	0.85	1.10	1.10
time (sec)	N/A	0.171	0.065	0.047	0.228	0.258	1.586	0.334	0.651

Problem 412	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	23	23	83	23	25	29	20	25	25
N.S.	1	1.00	3.61	1.00	1.09	1.26	0.87	1.09	1.09
time (sec)	N/A	0.209	0.085	0.056	0.243	0.255	3.808	0.406	0.425

Problem 413	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	23	23	140	23	25	42	22	25	25
N.S.	1	1.00	6.09	1.00	1.09	1.83	0.96	1.09	1.09
time (sec)	N/A	0.213	0.165	0.060	0.231	0.243	56.206	0.319	0.574

Problem 414	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	21	21	140	21	23	38	20	23	23
N.S.	1	1.00	6.67	1.00	1.10	1.81	0.95	1.10	1.10
time (sec)	N/A	0.191	0.162	0.059	0.229	0.260	10.048	0.311	0.546

Problem 415	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	B	A	F	F(-1)
verified	N/A	Yes	No	No	TBD	TBD	TBD	TBD	TBD
size	102	116	132	342	0	214	360	0	0
N.S.	1	1.14	1.29	3.35	0.00	2.10	3.53	0.00	0.00
time (sec)	N/A	0.549	0.210	1.197	0.000	0.278	144.219	0.000	0.000

Problem 416	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	23	23	139	23	25	45	22	25	25
N.S.	1	1.00	6.04	1.00	1.09	1.96	0.96	1.09	1.09
time (sec)	N/A	0.209	0.164	0.058	0.234	0.266	117.217	0.324	0.464

Problem 417	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	23	23	140	23	25	42	22	25	25
N.S.	1	1.00	6.09	1.00	1.09	1.83	0.96	1.09	1.09
time (sec)	N/A	0.209	0.156	0.068	0.230	0.264	23.097	0.301	0.534

Problem 418	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	20	20	161	20	22	35	19	22	22
N.S.	1	1.00	8.05	1.00	1.10	1.75	0.95	1.10	1.10
time (sec)	N/A	0.178	1.707	0.051	0.224	0.262	9.127	0.398	0.556

Problem 419	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	23	23	135	23	25	45	22	25	25
N.S.	1	1.00	5.87	1.00	1.09	1.96	0.96	1.09	1.09
time (sec)	N/A	0.212	0.139	0.066	0.239	0.279	54.173	0.302	0.473

Problem 420	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F(-2)	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	37	35	37	31	0	45	0	0	0
N.S.	1	0.95	1.00	0.84	0.00	1.22	0.00	0.00	0.00
time (sec)	N/A	0.311	0.016	0.510	0.000	0.266	0.000	0.000	0.000

Problem 421	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	152	153	132	177	172	169	299	0	0
N.S.	1	1.01	0.87	1.16	1.13	1.11	1.97	0.00	0.00
time (sec)	N/A	0.409	0.177	0.000	0.180	0.253	2.789	0.000	0.000

Problem 422	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	104	106	90	122	114	115	216	0	0
N.S.	1	1.02	0.87	1.17	1.10	1.11	2.08	0.00	0.00
time (sec)	N/A	0.356	0.094	0.000	0.180	0.316	2.348	0.000	0.000

Problem 423	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	53	53	54	68	56	64	131	0	0
N.S.	1	1.00	1.02	1.28	1.06	1.21	2.47	0.00	0.00
time (sec)	N/A	0.255	0.034	0.014	0.177	0.270	2.271	0.000	0.000

Problem 424	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	A	A	F	F(-1)
verified	N/A	Yes	No	No	TBD	TBD	TBD	TBD	TBD
size	54	54	108	246	0	93	452	0	0
N.S.	1	1.00	2.00	4.56	0.00	1.72	8.37	0.00	0.00
time (sec)	N/A	0.266	0.032	0.000	0.000	0.285	148.700	0.000	0.000

Problem 425	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	B	A	F	F(-1)
verified	N/A	Yes	No	No	TBD	TBD	TBD	TBD	TBD
size	102	116	132	342	0	214	360	0	0
N.S.	1	1.14	1.29	3.35	0.00	2.10	3.53	0.00	0.00
time (sec)	N/A	0.549	0.092	0.431	0.000	0.277	145.563	0.000	0.000

Problem 426	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	B	F(-1)	F	F(-1)
verified	N/A	Yes	No	No	TBD	TBD	TBD	TBD	TBD
size	169	204	170	473	0	401	0	0	0
N.S.	1	1.21	1.01	2.80	0.00	2.37	0.00	0.00	0.00
time (sec)	N/A	0.969	0.158	4.003	0.000	0.279	0.000	0.000	0.000

Problem 427	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	245	245	262	418	391	521	588	0	0
N.S.	1	1.00	1.07	1.71	1.60	2.13	2.40	0.00	0.00
time (sec)	N/A	0.530	0.254	9.882	0.190	0.271	8.035	0.000	0.000

Problem 428	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	161	161	179	281	259	353	408	0	0
N.S.	1	1.00	1.11	1.75	1.61	2.19	2.53	0.00	0.00
time (sec)	N/A	0.434	0.174	3.382	0.185	0.269	7.698	0.000	0.000

Problem 429	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	80	80	109	149	131	193	245	0	0
N.S.	1	1.00	1.36	1.86	1.64	2.41	3.06	0.00	0.00
time (sec)	N/A	0.311	0.094	0.831	0.197	0.306	6.867	0.000	0.000

Problem 430	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	C	F	B	F	F	F(-1)
verified	N/A	Yes	No	No	TBD	TBD	TBD	TBD	TBD
size	94	91	270	580	0	228	0	0	0
N.S.	1	0.97	2.87	6.17	0.00	2.43	0.00	0.00	0.00
time (sec)	N/A	0.407	0.189	0.801	0.000	0.264	0.000	0.000	0.000

Problem 431	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	B	F	F	B	F	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD
size	182	196	397	0	0	600	0	0	0
N.S.	1	1.08	2.18	0.00	0.00	3.30	0.00	0.00	0.00
time (sec)	N/A	0.959	0.246	0.000	0.000	0.271	0.000	0.000	0.000

Problem 432	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	B	F(-1)	F	F(-1)
verified	N/A	Yes	No	N/A	TBD	TBD	TBD	TBD	TBD
size	267	364	459	0	0	1165	0	0	0
N.S.	1	1.36	1.72	0.00	0.00	4.36	0.00	0.00	0.00
time (sec)	N/A	2.104	0.368	0.000	0.000	0.280	0.000	0.000	0.000

Problem 433	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	F	F	F(-2)	F(-1)	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	327	318	0	0	0	0	0	0	0
N.S.	1	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.772	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Problem 434	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	F	F	F(-2)	F	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	284	277	0	0	0	0	0	0	0
N.S.	1	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.677	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Problem 435	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	F	F	F(-2)	F	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	240	235	0	0	0	0	0	0	0
N.S.	1	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.581	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Problem 436	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	F	F	F(-2)	F	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	174	161	0	0	0	0	0	0	0
N.S.	1	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.792	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Problem 437	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	F	F	F(-2)	F	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	225	222	0	0	0	0	0	0	0
N.S.	1	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.589	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Problem 438	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	F	F	F(-2)	F(-1)	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	271	266	0	0	0	0	0	0	0
N.S.	1	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.679	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Problem 439	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	F	F	F(-2)	F(-1)	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	314	307	0	0	0	0	0	0	0
N.S.	1	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.754	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Problem 440	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	F(-2)	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	233	228	178	8183	343	4918	0	772	0
N.S.	1	0.98	0.76	35.12	1.47	21.11	0.00	3.31	0.00
time (sec)	N/A	2.275	0.302	57.146	0.210	0.480	0.000	0.371	0.000

Problem 441	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	F(-2)	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	165	162	124	3059	240	1875	0	528	0
N.S.	1	0.98	0.75	18.54	1.45	11.36	0.00	3.20	0.00
time (sec)	N/A	0.442	0.166	13.002	0.202	0.341	0.000	0.373	0.000

Problem 442	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	A	B	F(-2)	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	97	96	70	660	137	431	0	285	0
N.S.	1	0.99	0.72	6.80	1.41	4.44	0.00	2.94	0.00
time (sec)	N/A	0.309	0.081	1.915	0.195	0.285	0.000	0.310	0.000

Problem 443	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	46	46	32	68	57	52	141	95	0
N.S.	1	1.00	0.70	1.48	1.24	1.13	3.07	2.07	0.00
time (sec)	N/A	0.177	0.009	0.085	0.182	0.313	2.116	0.297	0.000

Problem 444	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	25	25	111	25	27	33	22	27	27
N.S.	1	1.00	4.44	1.00	1.08	1.32	0.88	1.08	1.08
time (sec)	N/A	0.213	0.158	0.076	0.258	0.265	6.047	0.327	0.447

Problem 445	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	25	25	177	25	27	46	24	27	27
N.S.	1	1.00	7.08	1.00	1.08	1.84	0.96	1.08	1.08
time (sec)	N/A	0.216	0.296	0.063	0.259	0.272	23.527	0.340	0.518

Problem 446	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	102	94	143	0	0	0	0	0	0
N.S.	1	0.92	1.40	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.264	0.513	0.000	0.000	0.000	0.000	0.000	0.000

Problem 447	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	119	111	98	0	0	0	0	0	0
N.S.	1	0.93	0.82	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.359	0.459	0.000	0.000	0.000	0.000	0.000	0.000

Problem 448	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	480	480	408	0	0	0	0	0	0
N.S.	1	1.00	0.85	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.970	1.518	0.000	0.000	0.000	0.000	0.000	0.000

Problem 449	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	F	F(-1)	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	350	350	304	0	0	0	0	0	0
N.S.	1	1.00	0.87	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.735	0.753	0.000	0.000	0.000	0.000	0.000	0.000

Problem 450	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	220	220	200	0	0	0	0	0	0
N.S.	1	1.00	0.91	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.498	0.354	0.000	0.000	0.000	0.000	0.000	0.000

Problem 451	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F(-2)	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	106	106	107	0	0	0	0	0	0
N.S.	1	1.00	1.01	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.259	0.056	0.000	0.000	0.000	0.000	0.000	0.000

Problem 452	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	27	27	29	27	0	29	24	29	29
N.S.	1	1.00	1.07	1.00	0.00	1.07	0.89	1.07	1.07
time (sec)	N/A	0.241	1.132	0.129	0.000	0.270	92.380	0.353	0.385

Problem 453	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	F(-2)	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	27	27	29	27	0	42	1	29	29
N.S.	1	1.00	1.07	1.00	0.00	1.56	0.04	1.07	1.07
time (sec)	N/A	0.239	1.337	0.145	0.000	0.278	0.000	0.379	0.433

Problem 454	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	B	B	B	A	B
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	115	113	108	284	218	215	908	199	174
N.S.	1	0.98	0.94	2.47	1.90	1.87	7.90	1.73	1.51
time (sec)	N/A	0.294	0.109	0.685	0.198	0.277	2.372	0.320	0.954

Problem 455	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	202	210	244	740	0	0	0	0	0
N.S.	1	1.04	1.21	3.66	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.558	0.155	0.774	0.000	0.000	0.000	0.000	0.000

Problem 456	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	No	TBD	TBD	TBD	TBD	TBD
size	295	312	339	1652	0	0	0	0	0
N.S.	1	1.06	1.15	5.60	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.740	0.234	1.197	0.000	0.000	0.000	0.000	0.000

2.3 Detailed conclusion table specific for Rubi results

The following table is specific to Rubi only. It gives additional statistics for each integral. the column **steps** is the number of steps used by Rubi to obtain the antiderivative. The **rules** column is the number of unique rules used. The **integrand size** column is the leaf size of the integrand. Finally the ratio $\frac{\text{number of rules}}{\text{integrand size}}$ is also given. The larger this ratio is, the harder the integral is to solve. In this test file, problem number [71] had the largest ratio of [1.19047999999999998]

Table 2.1: Rubi specific breakdown of results for each integral

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
1	A	4	4	1.06	19	0.211
2	A	4	4	1.06	19	0.211
3	A	4	4	1.06	17	0.235
4	A	4	4	1.17	16	0.250
5	A	3	3	1.00	19	0.158
6	A	4	4	1.04	19	0.211
7	A	4	4	1.02	19	0.211
8	A	4	4	1.05	19	0.211
9	A	4	4	1.01	21	0.190
10	A	4	4	1.01	21	0.190
11	A	4	4	0.99	19	0.211
12	A	4	4	0.99	18	0.222
13	A	2	2	1.01	21	0.095
14	A	2	2	0.95	21	0.095
15	A	2	2	1.01	21	0.095
16	A	4	4	0.99	21	0.190
17	A	4	4	0.99	21	0.190
18	A	4	4	1.01	21	0.190
19	A	4	4	0.99	21	0.190
20	A	4	4	0.99	21	0.190
21	A	5	5	0.90	19	0.263
22	A	4	4	0.94	18	0.222

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
23	A	2	2	0.98	21	0.095
24	A	2	2	0.97	21	0.095
25	A	2	2	0.97	21	0.095
26	A	2	2	0.98	21	0.095
27	A	4	4	0.94	21	0.190
28	A	5	5	0.92	21	0.238
29	A	4	4	0.99	21	0.190
30	A	4	4	0.99	21	0.190
31	A	2	2	1.00	21	0.095
32	A	2	2	1.00	21	0.095
33	A	2	2	1.00	19	0.105
34	A	2	2	1.00	18	0.111
35	A	2	2	1.00	21	0.095
36	A	4	4	1.05	21	0.190
37	A	6	6	1.05	21	0.286
38	A	8	8	1.03	21	0.381
39	A	3	3	1.03	21	0.143
40	A	3	3	1.14	21	0.143
41	A	3	3	1.08	19	0.158
42	A	2	2	1.00	18	0.111
43	A	5	5	1.18	21	0.238
44	A	2	2	1.00	21	0.095
45	A	2	2	1.00	21	0.095
46	A	4	4	1.04	21	0.190
47	A	4	4	1.08	21	0.190
48	A	3	3	0.97	19	0.158
49	A	3	3	0.83	18	0.167
50	A	9	9	1.25	21	0.429
51	A	2	2	1.00	21	0.095
52	A	2	2	1.00	21	0.095
53	A	5	5	1.05	21	0.238
54	A	6	6	1.08	21	0.286
55	A	5	5	1.12	21	0.238
56	A	3	3	0.99	21	0.143

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
57	A	4	4	0.83	19	0.211
58	A	3	3	0.81	18	0.167
59	A	13	13	1.47	21	0.619
60	A	2	2	1.00	21	0.095
61	A	2	2	1.00	21	0.095
62	A	11	11	1.11	21	0.524
63	A	11	11	1.14	21	0.524
64	A	11	11	1.15	21	0.524
65	A	3	3	0.93	21	0.143
66	A	5	5	0.91	21	0.238
67	A	4	4	0.85	21	0.190
68	A	4	4	0.82	21	0.190
69	A	4	4	0.80	19	0.211
70	A	3	3	0.78	18	0.167
71	B	25	25	2.05	21	1.190
72	A	2	2	1.00	21	0.095
73	A	2	2	1.00	21	0.095
74	A	1	1	1.00	13	0.077
75	A	1	1	1.00	14	0.071
76	A	2	2	1.00	21	0.095
77	A	2	2	1.00	19	0.105
78	A	2	2	1.00	18	0.111
79	A	6	5	0.90	21	0.238
80	A	2	2	1.00	21	0.095
81	A	2	2	1.00	21	0.095
82	A	2	2	1.00	21	0.095
83	A	2	2	1.00	21	0.095
84	A	2	2	1.00	23	0.087
85	A	2	2	1.00	21	0.095
86	A	3	3	0.90	20	0.150
87	A	9	8	1.23	23	0.348
88	A	2	2	1.00	23	0.087
89	A	2	2	1.00	23	0.087
90	A	2	2	1.00	23	0.087

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
91	A	2	2	1.00	23	0.087
92	A	2	2	1.00	23	0.087
93	A	2	2	1.00	23	0.087
94	A	2	2	1.00	21	0.095
95	A	3	3	0.93	20	0.150
96	A	3	3	0.92	23	0.130
97	A	6	6	0.96	23	0.261
98	A	9	9	0.93	23	0.391
99	A	12	12	0.93	23	0.522
100	A	2	2	1.00	23	0.087
101	A	2	2	1.00	23	0.087
102	A	2	2	1.00	21	0.095
103	A	3	3	0.92	20	0.150
104	A	7	7	1.03	23	0.304
105	A	2	2	1.00	23	0.087
106	A	2	2	1.00	23	0.087
107	A	2	2	1.10	23	0.087
108	A	2	2	1.13	23	0.087
109	A	4	4	0.96	21	0.190
110	A	6	6	1.01	20	0.300
111	A	11	11	1.14	23	0.478
112	A	2	2	1.04	23	0.087
113	A	2	2	1.08	23	0.087
114	A	2	2	1.09	23	0.087
115	A	5	5	0.96	23	0.217
116	A	8	8	1.01	21	0.381
117	A	10	10	1.00	20	0.500
118	A	15	15	1.45	23	0.652
119	A	2	2	1.03	23	0.087
120	A	8	8	1.53	13	0.615
121	A	4	4	0.92	23	0.174
122	A	7	7	0.99	23	0.304
123	A	10	10	1.15	23	0.435
124	A	2	2	1.00	20	0.100

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
125	A	2	2	1.00	22	0.091
126	A	2	2	1.00	22	0.091
127	N/A	1	0	1.00	22	0.000
128	N/A	2	0	1.00	22	0.000
129	N/A	2	0	1.00	22	0.000
130	A	4	4	0.90	23	0.174
131	A	7	6	0.98	23	0.261
132	A	8	7	0.92	21	0.333
133	A	6	5	0.93	20	0.250
134	A	16	15	1.03	23	0.652
135	A	4	4	0.97	23	0.174
136	A	4	4	0.93	23	0.174
137	A	4	4	0.89	23	0.174
138	A	7	6	0.97	23	0.261
139	A	9	8	0.90	21	0.381
140	A	7	6	0.90	20	0.300
141	A	22	21	1.21	23	0.913
142	A	4	4	0.97	23	0.174
143	A	4	4	0.96	23	0.174
144	A	4	4	0.91	23	0.174
145	A	7	6	0.99	23	0.261
146	A	7	6	0.95	21	0.286
147	A	5	4	0.97	20	0.200
148	A	11	10	0.95	23	0.435
149	A	4	4	0.97	23	0.174
150	A	4	4	0.92	23	0.174
151	A	4	4	0.93	23	0.174
152	A	7	6	1.00	23	0.261
153	A	6	5	0.98	21	0.238
154	A	4	3	1.00	20	0.150
155	A	15	14	1.04	23	0.609
156	A	5	5	0.92	23	0.217
157	N/A	1	0	1.00	23	0.000

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
158	N/A	1	0	1.00	21	0.000
159	N/A	1	0	1.00	20	0.000
160	N/A	1	0	1.00	23	0.000
161	N/A	1	0	1.00	23	0.000
162	A	3	3	0.98	23	0.130
163	A	4	4	1.20	23	0.174
164	A	3	3	0.99	21	0.143
165	A	1	1	1.00	16	0.062
166	N/A	1	0	1.00	23	0.000
167	N/A	1	0	1.00	23	0.000
168	N/A	1	0	1.00	15	0.000
169	A	2	2	1.00	14	0.143
170	N/A	1	0	1.00	17	0.000
171	A	2	2	1.02	21	0.095
172	A	2	2	1.02	21	0.095
173	A	4	4	1.00	19	0.211
174	A	2	2	1.00	21	0.095
175	A	2	2	1.06	21	0.095
176	A	4	4	1.02	21	0.190
177	A	2	2	1.02	21	0.095
178	A	2	2	1.02	21	0.095
179	A	2	2	1.00	18	0.111
180	A	2	2	0.98	21	0.095
181	A	4	4	1.06	21	0.190
182	A	4	4	1.05	21	0.190
183	A	4	4	1.01	23	0.174
184	A	4	4	1.01	23	0.174
185	A	6	5	0.99	21	0.238
186	A	2	2	0.99	23	0.087
187	A	4	4	1.01	23	0.174
188	A	2	2	0.99	23	0.087
189	A	2	2	0.99	23	0.087
190	A	2	2	0.99	23	0.087

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2.3. Detailed conclusion table specific for Rubi results

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
191	A	2	2	0.98	20	0.100
192	A	2	2	0.98	23	0.087
193	A	2	2	0.98	23	0.087
194	A	4	4	1.01	23	0.174
195	A	4	4	1.01	23	0.174
196	A	4	4	0.99	23	0.174
197	A	7	6	0.92	23	0.261
198	A	6	5	0.95	21	0.238
199	A	2	2	0.98	23	0.087
200	A	4	4	0.95	23	0.174
201	A	4	4	0.95	23	0.174
202	A	2	2	0.97	23	0.087
203	A	2	2	0.97	23	0.087
204	A	2	2	0.97	20	0.100
205	A	2	2	0.97	23	0.087
206	A	3	3	0.99	23	0.130
207	A	2	2	0.97	23	0.087
208	A	4	4	0.99	23	0.174
209	A	4	4	0.98	23	0.174
210	A	2	2	1.00	23	0.087
211	A	2	2	1.00	23	0.087
212	A	2	2	1.00	21	0.095
213	A	2	2	1.00	23	0.087
214	A	4	4	1.05	23	0.174
215	A	6	6	1.03	23	0.261
216	A	2	2	1.00	23	0.087
217	A	2	2	1.00	23	0.087
218	A	4	4	0.91	20	0.200
219	A	6	6	0.97	23	0.261
220	A	8	8	1.02	23	0.348
221	A	2	2	1.00	23	0.087
222	A	2	2	1.00	23	0.087
223	A	2	2	1.00	21	0.095
224	A	4	4	1.10	23	0.174

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
225	A	6	6	1.06	23	0.261
226	A	2	2	1.00	23	0.087
227	A	2	2	1.00	23	0.087
228	A	6	6	0.98	20	0.300
229	A	8	8	0.99	23	0.348
230	A	10	10	1.01	23	0.435
231	A	2	2	1.00	23	0.087
232	A	5	4	0.97	23	0.174
233	A	5	4	0.87	21	0.190
234	A	6	6	1.09	23	0.261
235	A	8	8	1.08	23	0.348
236	A	2	2	1.00	23	0.087
237	A	2	2	1.00	23	0.087
238	A	9	9	1.19	20	0.450
239	A	10	10	1.03	23	0.435
240	A	12	12	1.04	23	0.522
241	A	3	2	1.00	18	0.111
242	A	3	2	1.00	19	0.105
243	A	2	2	1.00	12	0.167
244	A	3	3	1.00	10	0.300
245	A	3	3	0.95	19	0.158
246	A	3	3	0.94	21	0.143
247	A	2	2	1.00	22	0.091
248	A	2	2	1.00	22	0.091
249	N/A	1	0	1.00	22	0.000
250	N/A	1	0	1.00	22	0.000
251	A	8	7	0.87	25	0.280
252	A	9	8	0.93	25	0.320
253	A	7	6	0.93	23	0.261
254	A	2	2	0.97	25	0.080
255	A	4	4	0.98	25	0.160
256	A	5	5	0.80	25	0.200
257	A	3	3	0.78	25	0.120

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2.3. Detailed conclusion table specific for Rubi results

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
258	C	15	14	0.75	22	0.636
259	A	5	5	0.71	25	0.200
260	A	6	5	0.93	25	0.200
261	A	8	7	0.93	25	0.280
262	A	10	9	0.94	25	0.360
263	A	8	7	0.84	25	0.280
264	A	10	9	0.91	25	0.360
265	A	8	7	0.90	23	0.304
266	A	2	2	0.97	25	0.080
267	A	4	4	0.98	25	0.160
268	A	5	5	0.80	25	0.200
269	C	20	19	0.94	22	0.864
270	A	5	5	0.78	25	0.200
271	A	3	3	0.78	25	0.120
272	A	7	6	0.91	25	0.240
273	A	9	8	0.91	25	0.320
274	A	11	10	0.93	25	0.400
275	A	7	6	1.07	13	0.462
276	A	8	7	0.90	25	0.280
277	A	8	7	0.95	25	0.280
278	A	6	5	1.01	23	0.217
279	A	13	12	0.93	25	0.480
280	A	4	4	0.98	25	0.160
281	A	5	5	0.73	25	0.200
282	C	11	10	0.66	22	0.455
283	A	5	4	0.96	25	0.160
284	A	7	6	0.95	25	0.240
285	A	9	8	0.96	25	0.320
286	A	6	5	0.93	25	0.200
287	A	8	7	0.95	25	0.280
288	A	7	6	1.00	25	0.240
289	A	5	4	1.00	23	0.174
290	A	2	2	0.99	25	0.080
291	A	2	2	0.98	25	0.080

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
292	A	5	5	0.71	25	0.200
293	A	4	3	1.00	22	0.136
294	A	7	6	0.97	25	0.240
295	A	8	7	0.98	25	0.280
296	A	11	10	1.03	25	0.400
297	A	6	5	0.92	25	0.200
298	A	7	6	0.95	25	0.240
299	A	7	6	0.96	25	0.240
300	A	6	5	0.95	23	0.217
301	A	2	2	0.98	25	0.080
302	A	2	2	0.98	25	0.080
303	A	3	3	0.83	25	0.120
304	A	3	3	0.78	25	0.120
305	A	5	4	0.94	25	0.160
306	A	6	5	1.03	22	0.227
307	A	8	7	0.97	25	0.280
308	A	10	9	0.99	25	0.360
309	A	9	8	0.76	33	0.242
310	A	7	6	0.84	31	0.194
311	A	11	10	0.58	33	0.303
312	A	3	3	0.63	33	0.091
313	A	5	5	0.53	33	0.152
314	A	11	10	0.56	30	0.333
315	A	4	4	0.77	33	0.121
316	A	6	6	0.75	33	0.182
317	A	6	5	1.21	13	0.385
318	A	3	3	0.98	25	0.120
319	A	4	4	1.20	25	0.160
320	A	3	3	0.99	23	0.130
321	A	1	1	1.00	16	0.062
322	N/A	1	0	1.00	25	0.000
323	N/A	1	0	1.00	25	0.000
324	A	2	2	1.00	22	0.091

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
325	A	2	2	1.00	22	0.091
326	A	2	2	1.00	20	0.100
327	N/A	1	0	1.00	22	0.000
328	N/A	1	0	1.00	22	0.000
329	A	3	3	1.00	23	0.130
330	A	3	3	1.00	23	0.130
331	A	3	3	1.00	21	0.143
332	A	2	2	1.00	20	0.100
333	A	3	3	1.00	23	0.130
334	A	3	3	1.00	23	0.130
335	A	5	5	0.82	23	0.217
336	A	7	7	0.86	23	0.304
337	A	3	3	1.00	21	0.143
338	A	3	3	1.00	21	0.143
339	A	3	3	1.00	19	0.158
340	A	2	2	1.00	18	0.111
341	A	3	3	1.00	21	0.143
342	A	3	3	1.00	21	0.143
343	A	5	5	0.86	21	0.238
344	A	7	7	0.88	21	0.333
345	A	3	2	1.00	22	0.091
346	A	3	2	1.00	23	0.087
347	A	3	2	1.00	25	0.080
348	A	5	4	1.00	18	0.222
349	A	5	4	1.00	18	0.222
350	A	5	4	1.00	22	0.182
351	A	6	5	0.66	27	0.185
352	A	6	5	0.70	27	0.185
353	A	6	5	0.94	25	0.200
354	A	1	1	1.00	18	0.056
355	A	3	3	0.83	27	0.111
356	A	3	3	1.00	27	0.111
357	A	6	5	0.61	27	0.185

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
358	A	6	5	0.57	27	0.185
359	A	4	4	0.68	29	0.138
360	A	6	6	0.71	29	0.207
361	A	6	6	0.72	27	0.222
362	A	2	2	1.01	20	0.100
363	A	4	4	0.78	29	0.138
364	A	4	4	0.79	29	0.138
365	A	7	7	0.80	29	0.241
366	A	13	12	0.76	29	0.414
367	A	4	4	1.05	21	0.190
368	A	4	4	1.05	21	0.190
369	A	4	4	1.05	19	0.211
370	A	2	2	1.00	21	0.095
371	A	2	2	1.00	21	0.095
372	A	2	2	1.00	21	0.095
373	A	4	4	1.05	21	0.190
374	A	4	4	1.05	21	0.190
375	A	3	3	1.12	18	0.167
376	A	5	5	1.18	21	0.238
377	A	2	2	1.00	21	0.095
378	A	2	2	1.00	21	0.095
379	A	4	4	1.01	23	0.174
380	A	4	4	0.98	23	0.174
381	A	4	4	1.01	21	0.190
382	A	4	4	1.02	23	0.174
383	A	4	4	1.23	23	0.174
384	A	4	4	1.21	23	0.174
385	A	4	4	1.01	23	0.174
386	A	4	4	1.01	23	0.174
387	A	2	2	0.97	20	0.100
388	A	4	4	0.98	23	0.174
389	A	4	4	1.01	23	0.174
390	A	4	4	1.01	23	0.174
391	A	4	4	1.01	23	0.174

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
392	A	4	4	0.99	23	0.174
393	A	4	4	0.98	23	0.174
394	A	4	4	0.99	21	0.190
395	A	4	4	1.01	23	0.174
396	A	4	4	0.99	23	0.174
397	A	4	4	0.98	23	0.174
398	A	4	4	0.99	23	0.174
399	A	4	4	0.99	23	0.174
400	A	2	2	0.97	20	0.100
401	A	4	4	0.98	23	0.174
402	A	4	4	0.99	23	0.174
403	A	4	4	0.99	23	0.174
404	A	4	4	0.99	23	0.174
405	A	4	4	0.98	23	0.174
406	N/A	1	0	1.00	23	0.000
407	N/A	1	0	1.00	21	0.000
408	A	2	2	1.00	23	0.087
409	N/A	1	0	1.00	23	0.000
410	N/A	1	0	1.00	23	0.000
411	N/A	1	0	1.00	20	0.000
412	N/A	1	0	1.00	23	0.000
413	N/A	1	0	1.00	23	0.000
414	N/A	1	0	1.00	21	0.000
415	A	5	5	1.14	23	0.217
416	N/A	1	0	1.00	23	0.000
417	N/A	1	0	1.00	23	0.000
418	N/A	1	0	1.00	20	0.000
419	N/A	1	0	1.00	23	0.000
420	A	6	5	0.95	25	0.200
421	A	4	4	1.01	23	0.174
422	A	4	4	1.02	23	0.174
423	A	2	2	1.00	21	0.095

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2.3. Detailed conclusion table specific for Rubi results

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
424	A	2	2	1.00	23	0.087
425	A	5	5	1.14	23	0.217
426	A	11	10	1.21	23	0.435
427	A	2	2	1.00	25	0.080
428	A	2	2	1.00	25	0.080
429	A	2	2	1.00	23	0.087
430	A	3	3	0.97	25	0.120
431	A	6	6	1.08	25	0.240
432	A	10	10	1.36	25	0.400
433	A	2	2	0.97	25	0.080
434	A	2	2	0.98	25	0.080
435	A	2	2	0.98	25	0.080
436	A	12	11	0.93	25	0.440
437	A	2	2	0.99	25	0.080
438	A	2	2	0.98	25	0.080
439	A	2	2	0.98	25	0.080
440	A	3	3	0.98	25	0.120
441	A	3	3	0.98	25	0.120
442	A	3	3	0.99	23	0.130
443	A	1	1	1.00	16	0.062
444	N/A	1	0	1.00	25	0.000
445	N/A	1	0	1.00	25	0.000
446	A	4	3	0.92	26	0.115
447	A	5	4	0.93	32	0.125
448	A	2	2	1.00	27	0.074
449	A	2	2	1.00	27	0.074
450	A	2	2	1.00	25	0.080
451	A	3	2	1.00	18	0.111
452	N/A	1	0	1.00	27	0.000
453	N/A	1	0	1.00	27	0.000
454	A	3	3	0.98	23	0.130
455	A	3	3	1.04	25	0.120
456	A	3	3	1.06	25	0.120

CHAPTER 3

LISTING OF INTEGRALS

3.1 $\int x^3(d+ex)(a+b\log(cx^n))\,dx$

3.1.1 Optimal result

Integrand size = 19, antiderivative size = 48

$$\int x^3(d+ex)(a+b\log(cx^n))\,dx=-\frac{1}{16}bdnx^4-\frac{1}{25}benx^5+\frac{1}{20}\left(5dx^4+4ex^5\right)(a+b\log(cx^n))$$

output
```
-1/16*b*d*n*x^4-1/25*b*e*n*x^5+1/20*(4*e*x^5+5*d*x^4)*(a+b*ln(c*x^n))
```

3.1.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.00

$$\int x^3(d+ex)(a+b\log(cx^n))\,dx=\frac{1}{400}x^4(20a(5d+4ex)-bn(25d+16ex)+20b(5d+4ex)\log(cx^n))$$

input
```
Integrate[x^3*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(20*a*(5*d + 4*e*x) - b*n*(25*d + 16*e*x) + 20*b*(5*d + 4*e*x)*Log[c*
x^n]))/400
```

3.1.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.211$, Rules used = {2771, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex)\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \ 2771$$

$$\frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)-bn\int\frac{1}{20}x^3(5d+4ex)dx$$

$$\Big\downarrow \ 27$$

$$\frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{20}bn\int x^3(5d+4ex)dx$$

$$\Big\downarrow \ 49$$

$$\frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{20}bn\int\left(4ex^4+5dx^3\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{1}{20}\left(5dx^4+4ex^5\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{20}bn\left(\frac{5dx^4}{4}+\frac{4ex^5}{5}\right)$$

input
```
Int[x^3*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
-1/20*(b*n*((5*d*x^4)/4 + (4*e*x^5)/5)) + ((5*d*x^4 + 4*e*x^5)*(a + b*Log[
c*x^n]))/20
```

3.1.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.1.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^5 \ln(c\,x^n) be}{5} - \frac{ben\,x^5}{25} + \frac{ae\,x^5}{5} + \frac{x^4 \ln(c\,x^n) bd}{4} - \frac{bdn\,x^4}{16} + \frac{ad\,x^4}{4}$
risch	$\frac{b\,x^4(4ex+5d)\ln(x^n)}{20} - \frac{i\pi be\,x^5 \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)}{10} + \frac{i\pi be\,x^5 \operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2}{10} + \frac{i\pi be\,x^5 \operatorname{csgn}(ix^n)\operatorname{csgn}(ic}{10}$

input
```
int(x^3*(e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/5*x^5*ln(c*x^n)*b*e-1/25*b*e*n*x^5+1/5*a*e*x^5+1/4*x^4*ln(c*x^n)*b*d-1/1
6*b*d*n*x^4+1/4*a*d*x^4
```

3.1.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^3(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{25}\,(ben-5\,ae)x^5 - \frac{1}{16}\,(bdn-4\,ad)x^4 + \frac{1}{20}\,\left(4\,bex^5+5\,bdx^4\right)\log\left(c\right) + \frac{1}{20}\,\left(4\,benx^5+5\,bdnx^4\right)\log\left(x\right)$$

input
```
integrate(x^3*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/25*(b*e*n - 5*a*e)*x^5 - 1/16*(b*d*n - 4*a*d)*x^4 + 1/20*(4*b*e*x^5 + 5
*b*d*x^4)*log(c) + 1/20*(4*b*e*n*x^5 + 5*b*d*n*x^4)*log(x)
```

3.1.6 Sympy [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x^3(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{adx^4}{4}+\frac{aex^5}{5}-\frac{bdnx^4}{16}+\frac{bdx^4\log\left(cx^n\right)}{4}-\frac{benx^5}{25}+\frac{bex^5\log\left(cx^n\right)}{5}$$

input
```
integrate(x**3*(e*x+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**4/4 + a*e*x**5/5 - b*d*n*x**4/16 + b*d*x**4*log(c*x**n)/4 - b*e*n*x
**5/25 + b*e*x**5*log(c*x**n)/5
```

3.1.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x^3(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{25}\,benx^5+\frac{1}{5}\,bex^5\log\left(cx^n\right)-\frac{1}{16}\,bdnx^4+\frac{1}{5}\,aex^5+\frac{1}{4}\,bdx^4\log\left(cx^n\right)+\frac{1}{4}\,adx^4$$

input
```
integrate(x^3*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*e*n*x^5 + 1/5*b*e*x^5*log(c*x^n) - 1/16*b*d*n*x^4 + 1/5*a*e*x^5 +
1/4*b*d*x^4*log(c*x^n) + 1/4*a*d*x^4
```

3.1.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^3(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{1}{5}\,benx^5\log\left(x\right)-\frac{1}{25}\,benx^5+\frac{1}{5}\,bex^5\log\left(c\right)+\frac{1}{4}\,bdnx^4\log\left(x\right)-\frac{1}{16}\,bdnx^4+\frac{1}{5}\,aex^5+\frac{1}{4}\,bdx^4\log\left(c\right)+\frac{1}{4}\,adx^4$$

input
```
integrate(x^3*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/5*b*e*n*x^5*log(x) - 1/25*b*e*n*x^5 + 1/5*b*e*x^5*log(c) + 1/4*b*d*n*x^4
*log(x) - 1/16*b*d*n*x^4 + 1/5*a*e*x^5 + 1/4*b*d*x^4*log(c) + 1/4*a*d*x^4
```

3.1.9 Mupad [B] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x^3(d+ex)\,(a+b\log{(cx^n)})\,dx = \ln{(c\,x^n)}\,\left(\frac{b\,e\,x^5}{5}+\frac{b\,d\,x^4}{4}\right) + \frac{d\,x^4\,(4\,a-b\,n)}{16}+\frac{e\,x^5\,(5\,a-b\,n)}{25}$$

input
```
int(x^3*(a + b*log(c*x^n))*(d + e*x),x)
```

output
```
log(c*x^n)*((b*d*x^4)/4 + (b*e*x^5)/5) + (d*x^4*(4*a - b*n))/16 + (e*x^5*(
5*a - b*n))/25
```

3.2 $\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx$

3.2.1 Optimal result

Integrand size = 19, antiderivative size = 48

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{9}bdnx^3-\frac{1}{16}benx^4+\frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)$$

output
```
-1/9*b*d*n*x^3-1/16*b*e*n*x^4+1/12*(3*e*x^4+4*d*x^3)*(a+b*ln(c*x^n))
```

3.2.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 45, normalized size of antiderivative = 0.94

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{1}{144}x^3(48ad-16bdn+36aex-9benx+12b(4d+3ex)\log\left(cx^n\right))$$

input
```
Integrate[x^2*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
(x^3*(48*a*d - 16*b*d*n + 36*a*e*x - 9*b*e*n*x + 12*b*(4*d + 3*e*x)*Log[c*
x^n]))/144
```

3.2.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.211, Rules used = {2771, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \text{ 2771}$$

$$\frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)-bn\int\frac{1}{12}x^2(4d+3ex)dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{12}bn\int x^2(4d+3ex)dx$$

$$\Big\downarrow \text{ 49}$$

$$\frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{12}bn\int\left(3ex^3+4dx^2\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{12}\left(4dx^3+3ex^4\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{12}bn\left(\frac{4dx^3}{3}+\frac{3ex^4}{4}\right)$$

input
```
Int[x^2*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
-1/12*(b*n*((4*d*x^3)/3 + (3*e*x^4)/4)) + ((4*d*x^3 + 3*e*x^4)*(a + b*Log[
c*x^n]))/12
```

3.2.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.2.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^4 be\ln(c\,x^n)}{4}-\frac{ben\,x^4}{16}+\frac{x^4 ae}{4}+\frac{x^3\ln(c\,x^n)bd}{3}-\frac{bdn\,x^3}{9}+\frac{x^3 ad}{3}$
risch	$\frac{b\,x^3(3ex+4d)\ln(x^n)}{12}-\frac{i\pi be\,x^4\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)}{8}+\frac{i\pi be\,x^4\operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2}{8}+\frac{i\pi be\,x^4\operatorname{csgn}(ix^n)\operatorname{csgn}(ic$

input
```
int(x^2*(e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/4*x^4*b*e*ln(c*x^n)-1/16*b*e*n*x^4+1/4*x^4*a*e+1/3*x^3*ln(c*x^n)*b*d-1/9
*b*d*n*x^3+1/3*x^3*a*d
```

3.2.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{16}\left(ben-4\,ae\right)x^4-\frac{1}{9}\left(bdn-3\,ad\right)x^3+\frac{1}{12}\left(3\,bex^4+4\,bdx^3\right)\log\left(c\right)+\frac{1}{12}\left(3\,benx^4+4\,bdnx^3\right)\log\left(x\right)$$

input
```
integrate(x^2*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/16*(b*e*n - 4*a*e)*x^4 - 1/9*(b*d*n - 3*a*d)*x^3 + 1/12*(3*b*e*x^4 + 4*
b*d*x^3)*log(c) + 1/12*(3*b*e*n*x^4 + 4*b*d*n*x^3)*log(x)
```

3.2.6 Sympy [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{adx^3}{3}+\frac{aex^4}{4}-\frac{bdnx^3}{9}+\frac{bdx^3\log\left(cx^n\right)}{3}-\frac{benx^4}{16}+\frac{bex^4\log\left(cx^n\right)}{4}$$

input
```
integrate(x**2*(e*x+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**3/3 + a*e*x**4/4 - b*d*n*x**3/9 + b*d*x**3*log(c*x**n)/3 - b*e*n*x**
*4/16 + b*e*x**4*log(c*x**n)/4
```

3.2.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{16}benx^4+\frac{1}{4}bex^4\log\left(cx^n\right)-\frac{1}{9}bdnx^3+\frac{1}{4}aex^4+\frac{1}{3}bdx^3\log\left(cx^n\right)+\frac{1}{3}adx^3$$

input
```
integrate(x^2*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*e*n*x^4 + 1/4*b*e*x^4*log(c*x^n) - 1/9*b*d*n*x^3 + 1/4*a*e*x^4 + 1
/3*b*d*x^3*log(c*x^n) + 1/3*a*d*x^3
```

3.2.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{1}{4}benx^4\log\left(x\right)-\frac{1}{16}benx^4+\frac{1}{4}bex^4\log\left(c\right)+\frac{1}{3}bdnx^3\log\left(x\right)-\frac{1}{9}bdnx^3+\frac{1}{4}aex^4+\frac{1}{3}bdx^3\log\left(c\right)+\frac{1}{3}adx^3$$

input
```
integrate(x^2*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*b*e*n*x^4*log(x) - 1/16*b*e*n*x^4 + 1/4*b*e*x^4*log(c) + 1/3*b*d*n*x^3
*log(x) - 1/9*b*d*n*x^3 + 1/4*a*e*x^4 + 1/3*b*d*x^3*log(c) + 1/3*a*d*x^3
```

3.2.9 Mupad [B] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x^2(d+ex)\,(a+b\log{(cx^n)})\;dx = \ln{(c\,x^n)}\,\left(\frac{b\,e\,x^4}{4}+\frac{b\,d\,x^3}{3}\right) + \frac{d\,x^3\,(3\,a-b\,n)}{9}+\frac{e\,x^4\,(4\,a-b\,n)}{16}$$

input
```
int(x^2*(a + b*log(c*x^n))*(d + e*x),x)
```

output
```
log(c*x^n)*((b*d*x^3)/3 + (b*e*x^4)/4) + (d*x^3*(3*a - b*n))/9 + (e*x^4*(4
*a - b*n))/16
```

3.3 $\int x(d+ex)(a+b\log(cx^n))\,dx$

3.3.1 Optimal result

Integrand size = 17, antiderivative size = 48

$$\int x(d+ex)(a+b\log(cx^n))\,dx=-\frac{1}{4}bdnx^2-\frac{1}{9}benx^3+\frac{1}{6}(3dx^2+2ex^3)(a+b\log(cx^n))$$

output
```
-1/4*b*d*n*x^2-1/9*b*e*n*x^3+1/6*(2*e*x^3+3*d*x^2)*(a+b*ln(c*x^n))
```

3.3.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.00

$$\int x(d+ex)(a+b\log(cx^n))\,dx=\frac{1}{36}x^2(6a(3d+2ex)-bn(9d+4ex)+6b(3d+2ex)\log(cx^n))$$

input
```
Integrate[x*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(6*a*(3*d + 2*e*x) - b*n*(9*d + 4*e*x) + 6*b*(3*d + 2*e*x)*Log[c*x^n]
))/36
```

3.3.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.235, Rules used = {2771, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \text{ 2771}$$

$$\frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)-bn\int \frac{1}{6}x(3d+2ex)dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{6}bn\int x(3d+2ex)dx$$

$$\Big\downarrow \text{ 49}$$

$$\frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{6}bn\int \left(2ex^2+3dx\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{6}\left(3dx^2+2ex^3\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{6}bn\left(\frac{3dx^2}{2}+\frac{2ex^3}{3}\right)$$

input
```
Int[x*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
-1/6*(b*n*((3*d*x^2)/2 + (2*e*x^3)/3)) + ((3*d*x^2 + 2*e*x^3)*(a + b*Log[c
*x^n]))/6
```

3.3.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.3.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^{3} b e \ln\left(c\,x^{n}\right)}{3}-\frac{b e n\,x^{3}}{9}+\frac{x^{3} a e}{3}+\frac{x^{2} \ln\left(c\,x^{n}\right) b d}{2}-\frac{b d n\,x^{2}}{4}+\frac{a d\,x^{2}}{2}$
risch	$\frac{b\,x^{2}\left(2 e x+3 d\right) \ln\left(x^{n}\right)}{6}-\frac{i \pi b e\,x^{3} \operatorname{csgn}\left(i c\right) \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right)}{6}+\frac{i \pi b e\,x^{3} \operatorname{csgn}\left(i c\right) \operatorname{csgn}\left(i c\,x^{n}\right)^{2}}{6}+\frac{i \pi b e\,x^{3} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}(ic\cdots}{6}$

input
```
int(x*(e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/3*x^3*b*e*ln(c*x^n)-1/9*b*e*n*x^3+1/3*x^3*a*e+1/2*x^2*ln(c*x^n)*b*d-1/4*
b*d*n*x^2+1/2*a*d*x^2
```

3.3.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\begin{aligned}\int x(d+ex)\left(a+b\log\left(cx^{n}\right)\right)\,dx = & -\frac{1}{9}\,(ben-3\,ae)x^{3}-\frac{1}{4}\,(bdn-2\,ad)x^{2} \\ & +\frac{1}{6}\,\left(2\,bex^{3}+3\,bdx^{2}\right)\log\left(c\right) \\ & +\frac{1}{6}\,\left(2\,benx^{3}+3\,bdnx^{2}\right)\log\left(x\right)\end{aligned}$$

input
```
integrate(x*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/9*(b*e*n - 3*a*e)*x^3 - 1/4*(b*d*n - 2*a*d)*x^2 + 1/6*(2*b*e*x^3 + 3*b*
d*x^2)*log(c) + 1/6*(2*b*e*n*x^3 + 3*b*d*n*x^2)*log(x)
```

3.3.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{adx^2}{2}+\frac{aex^3}{3}-\frac{bdnx^2}{4}+\frac{bdx^2\log\left(cx^n\right)}{2}-\frac{benx^3}{9}+\frac{bex^3\log\left(cx^n\right)}{3}$$

input
```
integrate(x*(e*x+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**2/2 + a*e*x**3/3 - b*d*n*x**2/4 + b*d*x**2*log(c*x**n)/2 - b*e*n*x**
*3/9 + b*e*x**3*log(c*x**n)/3
```

3.3.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{9}\,benx^3+\frac{1}{3}\,bex^3\log\left(cx^n\right)-\frac{1}{4}\,bdnx^2+\frac{1}{3}\,aex^3+\frac{1}{2}\,bdx^2\log\left(cx^n\right)+\frac{1}{2}\,adx^2$$

input
```
integrate(x*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/9*b*e*n*x^3 + 1/3*b*e*x^3*log(c*x^n) - 1/4*b*d*n*x^2 + 1/3*a*e*x^3 + 1/
2*b*d*x^2*log(c*x^n) + 1/2*a*d*x^2
```

3.3.8 Giac [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{1}{3}\,benx^3\log\left(x\right)-\frac{1}{9}\,benx^3+\frac{1}{3}\,bex^3\log\left(c\right)+\frac{1}{2}\,bdnx^2\log\left(x\right)-\frac{1}{4}\,bdnx^2+\frac{1}{3}\,aex^3+\frac{1}{2}\,bdx^2\log\left(c\right)+\frac{1}{2}\,adx^2$$

input
```
integrate(x*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/3*b*e*n*x^3*log(x) - 1/9*b*e*n*x^3 + 1/3*b*e*x^3*log(c) + 1/2*b*d*n*x^2*
log(x) - 1/4*b*d*n*x^2 + 1/3*a*e*x^3 + 1/2*b*d*x^2*log(c) + 1/2*a*d*x^2
```

3.3.9 Mupad [B] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=\ln\left(c\,x^n\right)\left(\frac{b\,e\,x^3}{3}+\frac{b\,d\,x^2}{2}\right)+\frac{d\,x^2\,\left(2\,a-b\,n\right)}{4}+\frac{e\,x^3\,\left(3\,a-b\,n\right)}{9}$$

input
```
int(x*(a + b*log(c*x^n))*(d + e*x),x)
```

output
```
log(c*x^n)*((b*d*x^2)/2 + (b*e*x^3)/3) + (d*x^2*(2*a - b*n))/4 + (e*x^3*(3
*a - b*n))/9
```

3.4 $\int (d+ex)(a+b\log(cx^n))\,dx$

3.4.1 Optimal result

Integrand size = 16, antiderivative size = 48

$$\int (d+ex)(a+b\log(cx^n))\,dx = -bdnx-\frac{1}{4}benx^2+dx(a+b\log(cx^n))+\frac{1}{2}ex^2(a+b\log(cx^n))$$

output
```
-b*d*n*x-1/4*b*e*n*x^2+d*x*(a+b*ln(c*x^n))+1/2*e*x^2*(a+b*ln(c*x^n))
```

3.4.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.15

$$\int (d+ex)(a+b\log(cx^n))\,dx = adx-bdnx+\frac{1}{2}aex^2-\frac{1}{4}benx^2+bdx\log(cx^n)+\frac{1}{2}bex^2\log(cx^n)$$

input
```
Integrate[(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
a*d*x - b*d*n*x + (a*e*x^2)/2 - (b*e*n*x^2)/4 + b*d*x*Log[c*x^n] + (b*e*x^
2*Log[c*x^n])/2
```

3.4.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.17, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.250, Rules used = {2750, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \; 2750$$

$$\frac{(d+ex)^2(a+b\log(cx^n))}{2e}-bn\int \frac{(d+ex)^2}{2ex}dx$$

$$\Big\downarrow \; 27$$

$$\frac{(d+ex)^2(a+b\log(cx^n))}{2e}-\frac{bn\int \frac{(d+ex)^2}{x}dx}{2e}$$

$$\Big\downarrow \; 49$$

$$\frac{(d+ex)^2(a+b\log(cx^n))}{2e}-\frac{bn\int \left(\frac{d^2}{x}+2ed+e^2x\right)dx}{2e}$$

$$\Big\downarrow \; 2009$$

$$\frac{(d+ex)^2(a+b\log(cx^n))}{2e}-\frac{bn\left(d^2\log(x)+2dex+\frac{e^2x^2}{2}\right)}{2e}$$

input
```
Int[(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
-1/2*(b*n*(2*d*e*x + (e^2*x^2)/2 + d^2*Log[x]))/e + ((d + e*x)^2*(a + b*Lo
g[c*x^n]))/(2*e)
```

3.4.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

3.4.4 Maple [A] (verified)

Time = 0.09 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.04

method	result
parallelrisch	$\frac{be\,x^2\ln(c\,x^n)}{2}-\frac{ben\,x^2}{4}+\frac{ae\,x^2}{2}+x\ln\left(c\,x^n\right)bd-bdnx+xad$
default	$xad+\frac{ae\,x^2}{2}+bd(x\ln\left(c\,x^n\right)-nx)+\frac{be\,x^2\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)}{2}-\frac{ben\,x^2}{4}$
parts	$a\left(\frac{1}{2}e\,x^2+dx\right)+b\left(x\ln\left(c\,x^n\right)d-xdn+\frac{e\,x^2\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)}{2}-\frac{en\,x^2}{4}\right)$
norman	$\left(-\frac{1}{4}ben+\frac{1}{2}ae\right)x^2+\left(-bdn+ad\right)x+bdx\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)+\frac{be\,x^2\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)}{2}$
risch	$\frac{bx(ex+2d)\ln(x^n)}{2}-\frac{i\pi\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)be\,x^2}{4}+\frac{i\pi\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2be\,x^2}{4}+\frac{i\pi\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2b}{4}$

input
```
int((e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/2*b*e*x^2*ln(c*x^n)-1/4*b*e*n*x^2+1/2*a*e*x^2+x*ln(c*x^n)*b*d-b*d*n*x+x*
a*d
```

3.4.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.27

$$\int (d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{4}\,(ben-2\,ae)x^2-(bdn-ad)x+\frac{1}{2}\left(bex^2+2\,bdx\right)\log\left(c\right)+\frac{1}{2}\left(benx^2+2\,bdnx\right)\log\left(x\right)$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/4*(b*e*n - 2*a*e)*x^2 - (b*d*n - a*d)*x + 1/2*(b*e*x^2 + 2*b*d*x)*log(c
) + 1/2*(b*e*n*x^2 + 2*b*d*n*x)*log(x)
```

3.4.6 Sympy [A] (verification not implemented)

Time = 0.14 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.17

$$\int (d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = adx+\frac{aex^2}{2}-bdnx+bdx\log\left(cx^n\right)-\frac{benx^2}{4}+\frac{bex^2\log\left(cx^n\right)}{2}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x + a*e*x**2/2 - b*d*n*x + b*d*x*log(c*x**n) - b*e*n*x**2/4 + b*e*x**2
*log(c*x**n)/2
```

3.4.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.02

$$\int (d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{4}\,benx^2+\frac{1}{2}\,bex^2\log\left(cx^n\right)-bdnx+\frac{1}{2}\,aex^2+bdx\log\left(cx^n\right)+adx$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/4*b*e*n*x^2 + 1/2*b*e*x^2*log(c*x^n) - b*d*n*x + 1/2*a*e*x^2 + b*d*x*lo
g(c*x^n) + a*d*x
```

3.4.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

$$\int (d+ex)(a+b\log(cx^n))\,dx = \frac{1}{2}benx^2\log(x) - \frac{1}{4}benx^2 + \frac{1}{2}bex^2\log(c) + bdnx\log(x) - bdnx + \frac{1}{2}aex^2 + bdx\log(c) + adx$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/2*b*e*n*x^2*log(x) - 1/4*b*e*n*x^2 + 1/2*b*e*x^2*log(c) + b*d*n*x*log(x)
 - b*d*n*x + 1/2*a*e*x^2 + b*d*x*log(c) + a*d*x
```

3.4.9 Mupad [B] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.90

$$\int (d+ex)(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,e\,x^2}{2} + b\,d\,x\right) + d\,x\,(a-b\,n) + \frac{e\,x^2\,(2\,a-b\,n)}{4}$$

input
```
int((a + b*log(c*x^n))*(d + e*x),x)
```

output
```
log(c*x^n)*(b*d*x + (b*e*x^2)/2) + d*x*(a - b*n) + (e*x^2*(2*a - b*n))/4
```

3.5 $\int \frac{(d+ex)(a+b\log(cx^n))}{x} dx$

3.5.1 Optimal result

Integrand size = 19, antiderivative size = 44

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x} dx = aex - benx + bex\log(cx^n) + \frac{d(a+b\log(cx^n))^2}{2bn}$$

output
```
a*e*x-b*e*n*x+b*e*x*ln(c*x^n)+1/2*d*(a+b*ln(c*x^n))^2/b/n
```

3.5.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.98

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x} dx = aex - benx + ad\log(x) + bex\log(cx^n) + \frac{bd\log^2(cx^n)}{2n}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n]))/x,x]
```

output
```
a*e*x - b*e*n*x + a*d*Log[x] + b*e*x*Log[c*x^n] + (b*d*Log[c*x^n]^2)/(2*n)
```

3.5.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {2788, 2009, 2738}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \text{2788}$$

$$d\int \frac{a+b\log(cx^n)}{x}dx+e\int (a+b\log(cx^n))dx$$

$$\Big\downarrow \text{2009}$$

$$d\int \frac{a+b\log(cx^n)}{x}dx+e(ax+bx\log(cx^n)-bnx)$$

$$\Big\downarrow \text{2738}$$

$$\frac{d(a+b\log(cx^n))^2}{2bn}+e(ax+bx\log(cx^n)-bnx)$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(d*(a + b*Log[c*x^n])^2)/(2*b*n) + e*(a*x - b*n*x + b*x*Log[c*x^n])
```

3.5.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2738
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(x_), x_Symbol] :> Simp[(a + b*Lo
g[c*x^n])^2/(2*b*n), x] /; FreeQ[{a, b, c, n}, x]
```

rule 2788
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Simp[d   Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x)
, x], x] + Simp[e   Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

3.5.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.05

method	result
default	$\ln(x) ad + aex + bex \ln\left(c\,\mathrm{e}^{n\ln(x)}\right) + \frac{bd \ln\left(c\,\mathrm{e}^{n\ln(x)}\right)^2}{2n} - benx$
parts	$\ln(x) ad + aex + bex \ln\left(c\,\mathrm{e}^{n\ln(x)}\right) + \frac{bd \ln\left(c\,\mathrm{e}^{n\ln(x)}\right)^2}{2n} - benx$
parallelrisch	$\frac{2x\ln(c\,x^n)ben - 2xbe\,n^2 + 2\ln(x)adn + 2xaen + bd\ln(c\,x^n)^2}{2n}$
norman	$(-ben + ae)\,x + \frac{ad\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)}{n} + bex\ln\left(c\,\mathrm{e}^{n\ln(x)}\right) + \frac{bd\ln\left(c\,\mathrm{e}^{n\ln(x)}\right)^2}{2n}$
risch	$(bex + bd\ln(x))\ln(x^n) - \frac{bdn\ln(x)^2}{2} - \frac{i\pi bex\,\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)}{2} + \frac{i\pi bex\,\operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2}{2} + i$

input
```
int((e*x+d)*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
ln(x)*a*d+a*e*x+b*e*x*ln(c*exp(n*ln(x)))+1/2*b*d/n*ln(c*exp(n*ln(x)))^2-b*
e*n*x
```

3.5.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex)\,(a+b\log(cx^n))}{x}\,dx = \frac{1}{2}\,bdn\log(x)^2 + bex\log(c) - (ben - ae)x + (benx + bd\log(c) + ad)\log(x)$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*b*d*n*log(x)^2 + b*e*x*log(c) - (b*e*n - a*e)*x + (b*e*n*x + b*d*log(c
) + a*d)*log(x)
```

3.5.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 65, normalized size of antiderivative = 1.48

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \begin{cases} \frac{ad\log\left(cx^n\right)}{n} + aex + \frac{bd\log\left(cx^n\right)^2}{2n} - benx + bex\log\left(cx^n\right) & \text{for } n \neq 0 \\ \left(a+b\log\left(c\right)\right)\left(d\log\left(x\right)+ex\right) & \text{otherwise} \end{cases}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise((a*d*log(c*x**n)/n + a*e*x + b*d*log(c*x**n)**2/(2*n) - b*e*n*x
+ b*e*x*log(c*x**n), Ne(n, 0)), ((a + b*log(c))*(d*log(x) + e*x), True))
```

3.5.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 41, normalized size of antiderivative = 0.93

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = -benx + bex\log\left(cx^n\right) + aex + \frac{bd\log\left(cx^n\right)^2}{2\,n} + ad\log\left(x\right)$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
-b*e*n*x + b*e*x*log(c*x^n) + a*e*x + 1/2*b*d*log(c*x^n)^2/n + a*d*log(x)
```

3.5.8 Giac [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.07

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = benx\log\left(x\right) + \frac{1}{2}bdn\log\left(x\right)^2 - \left(ben - be\log\left(c\right) - ae\right)x + \left(bd\log\left(c\right) + ad\right)\log\left(x\right)$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
b*e*n*x*log(x) + 1/2*b*d*n*log(x)^2 - (b*e*n - b*e*log(c) - a*e)*x + (b*d*
log(c) + a*d)*log(x)
```

3.5.9 Mupad [B] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 40, normalized size of antiderivative = 0.91

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})}{x}\,dx = a\,d\,\ln{(x)} + e\,x\,(a-b\,n) + b\,e\,x\,\ln{(c\,x^n)} + \frac{b\,d\ln{(c\,x^n)}^2}{2\,n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x))/x,x)
```

output
```
a*d*log(x) + e*x*(a - b*n) + b*e*x*log(c*x^n) + (b*d*log(c*x^n)^2)/(2*n)
```

3.6 $\int \frac{(d+ex)(a+b\log(cx^n))}{x^2} dx$

3.6.1 Optimal result

Integrand size = 19, antiderivative size = 48

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^2} dx = -\frac{bdn}{x} - \frac{d(a+b\log(cx^n))}{x} + \frac{e(a+b\log(cx^n))^2}{2bn}$$

output
```
-b*d*n/x-d*(a+b*ln(c*x^n))/x+1/2*e*(a+b*ln(c*x^n))^2/b/n
```

3.6.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^2} dx = -\frac{bdn}{x} - \frac{d(a+b\log(cx^n))}{x} + \frac{e(a+b\log(cx^n))^2}{2bn}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((b*d*n)/x) - (d*(a + b*Log[c*x^n]))/x + (e*(a + b*Log[c*x^n])^2)/(2*b*n)
```

3.6.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.04, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.211, Rules used = {2772, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^2}\,dx$$

$$\Big\downarrow \ 2772$$

$$-bn\int -\frac{d-ex\log(x)}{x^2}dx-\frac{d(a+b\log(cx^n))}{x}+e\log(x)(a+b\log(cx^n))$$

$$\Big\downarrow \ 25$$

$$bn\int \frac{d-ex\log(x)}{x^2}dx-\frac{d(a+b\log(cx^n))}{x}+e\log(x)(a+b\log(cx^n))$$

$$\Big\downarrow \ 2010$$

$$bn\int \left(\frac{d}{x^2}-\frac{e\log(x)}{x}\right)dx-\frac{d(a+b\log(cx^n))}{x}+e\log(x)(a+b\log(cx^n))$$

$$\Big\downarrow \ 2009$$

$$-\frac{d(a+b\log(cx^n))}{x}+e\log(x)(a+b\log(cx^n))+bn\left(-\frac{d}{x}-\frac{1}{2}e\log^2(x)\right)$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
b*n*(-(d/x) - (e*Log[x]^2)/2) - (d*(a + b*Log[c*x^n]))/x + e*Log[x]*(a + b
*Log[c*x^n])
```

3.6.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.6.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.10

method	result
parallelrisch	$\frac{2\ln(x)xaen+be\ln(c\,x^n)^2x-2\ln(c\,x^n)bdn-2bd\,n^2-2adn}{2xn}$
risch	$-\frac{b(-ex\ln(x)+d)\ln(x^n)}{x}-\frac{i\ln(x)\pi be\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)x-i\ln(x)\pi be\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2x-i\ln(x)\pi be\ \mathrm{csgn}(i}{}$

input
```
int((e*x+d)*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
1/2/x*(2*ln(x)*x*a*e*n+b*e*ln(c*x^n)^2*x-2*ln(c*x^n)*b*d*n-2*b*d*n^2-2*a*d
*n)/n
```

3.6.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.04

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx$$
$$=\frac{benx\log\left(x\right)^2-2\,bdn-2\,bd\log\left(c\right)-2\,ad+2\,\left(bex\log\left(c\right)-bdn+aex\right)\log\left(x\right)}{2\,x}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
1/2*(b*e*n*x*log(x)^2 - 2*b*d*n - 2*b*d*log(c) - 2*a*d + 2*(b*e*x*log(c) -
 b*d*n + a*e*x)*log(x))/x
```

3.6.6 Sympy [A] (verification not implemented)

Time = 1.64 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = -\frac{ad}{x}+ae\log\left(x\right)+bd\left(-\frac{n}{x}-\frac{\log\left(cx^n\right)}{x}\right) - be\left(\begin{cases}-\log\left(c\right)\log\left(x\right) & \text{for}\ n=0\\ -\frac{\log\left(cx^n\right)^2}{2n} & \text{otherwise}\end{cases}\right)$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))/x**2,x)
```

output
```
-a*d/x + a*e*log(x) + b*d*(-n/x - log(c*x**n)/x) - b*e*Piecewise((-log(c)*
log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

3.6.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = \frac{be\log\left(cx^n\right)^2}{2\,n}+ae\log\left(x\right)-\frac{bdn}{x}-\frac{bd\log\left(cx^n\right)}{x}-\frac{ad}{x}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
1/2*b*e*log(c*x^n)^2/n + a*e*log(x) - b*d*n/x - b*d*log(c*x^n)/x - a*d/x
```

3.6.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.15

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx = \frac{1}{2}\,ben\log\left(x\right)^2-bdn\left(\frac{\log\left(x\right)}{x}+\frac{1}{x}\right) + be\log\left(c\right)\log\left(|x|\right)+ae\log\left(|x|\right)-\frac{bd\log\left(c\right)}{x}-\frac{ad}{x}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
1/2*b*e*n*log(x)^2 - b*d*n*(log(x)/x + 1/x) + b*e*log(c)*log(abs(x)) + a*e
*log(abs(x)) - b*d*log(c)/x - a*d/x
```

3.6.9 Mupad [B] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^2}\,dx = \ln(x)\,(a\,e+b\,e\,n)-\frac{a\,d+b\,d\,n}{x} - \frac{\ln(c\,x^n)\,(b\,d+b\,e\,x)}{x}+\frac{b\,e\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x))/x^2,x)
```

output
```
log(x)*(a*e + b*e*n) - (a*d + b*d*n)/x - (log(c*x^n)*(b*d + b*e*x))/x + (b
*e*log(c*x^n)^2)/(2*n)
```

3.7 $\int \frac{(d+ex)(a+b\log(cx^n))}{x^3}\,dx$

3.7.1 Optimal result

Integrand size = 19, antiderivative size = 60

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx=-\frac{bdn}{4x^2}-\frac{ben}{x}+\frac{be^2n\log(x)}{2d}-\frac{(d+ex)^2\left(a+b\log\left(cx^n\right)\right)}{2dx^2}$$

output
```
-1/4*b*d*n/x^2-b*e*n/x+1/2*b*e^2*n*ln(x)/d-1/2*(e*x+d)^2*(a+b*ln(c*x^n))/d
/x^2
```

3.7.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 41, normalized size of antiderivative = 0.68

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx=-\frac{2a(d+2ex)+bn(d+4ex)+2b(d+2ex)\log\left(cx^n\right)}{4x^2}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/4*(2*a*(d + 2*e*x) + b*n*(d + 4*e*x) + 2*b*(d + 2*e*x)*Log[c*x^n])/x^2
```

3.7.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.02, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.211, Rules used = {2772, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^3}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{(d+ex)^2}{2dx^3}dx-\frac{(d+ex)^2(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(d+ex)^2}{x^3}dx}{2d}-\frac{(d+ex)^2(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow \text{49}$$

$$\frac{bn\int \left(\frac{d^2}{x^3}+\frac{2ed}{x^2}+\frac{e^2}{x}\right)dx}{2d}-\frac{(d+ex)^2(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(-\frac{d^2}{2x^2}-\frac{2de}{x}+e^2\log(x)\right)}{2d}-\frac{(d+ex)^2(a+b\log(cx^n))}{2dx^2}$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-1/2*d^2/x^2 - (2*d*e)/x + e^2*Log[x]))/(2*d) - ((d + e*x)^2*(a + b*
Log[c*x^n]))/(2*d*x^2)
```

3.7.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.7.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 47, normalized size of antiderivative = 0.78

method	result
parallelrisch	$-\frac{4bex\ln(c\,x^n)+4benx+4aex+2b\ln(c\,x^n)d+bdn+2ad}{4x^2}$
risch	$-\frac{b(2ex+d)\ln(x^n)}{2x^2}-$ $-2i\pi bex\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)+2i\pi bex\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2+2i\pi bex\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2$

input
```
int((e*x+d)*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
-1/4/x^2*(4*b*e*x*ln(c*x^n)+4*b*e*n*x+4*a*e*x+2*b*ln(c*x^n)*d+b*d*n+2*a*d)
```

3.7.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.88

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^3}\,dx = -\frac{bdn+2\,ad+4\,(ben+ae)x+2\,(2\,bex+bd)\log(c)+2\,(2\,benx+bdn)\log(x)}{4\,x^2}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
-1/4*(b*d*n + 2*a*d + 4*(b*e*n + a*e)*x + 2*(2*b*e*x + b*d)*log(c) + 2*(2*
b*e*n*x + b*d*n)*log(x))/x^2
```

3.7.6 Sympy [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 58, normalized size of antiderivative = 0.97

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^3}\,dx = -\frac{ad}{2x^2} - \frac{ae}{x} - \frac{bdn}{4x^2} - \frac{bd\log(cx^n)}{2x^2} - \frac{ben}{x} - \frac{be\log(cx^n)}{x}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))/x**3,x)
```

output
```
-a*d/(2*x**2) - a*e/x - b*d*n/(4*x**2) - b*d*log(c*x**n)/(2*x**2) - b*e*n/
x - b*e*log(c*x**n)/x
```

3.7.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 57, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^3}\,dx = -\frac{ben}{x} - \frac{be\log(cx^n)}{x} - \frac{bdn}{4\,x^2} - \frac{ae}{x} - \frac{bd\log(cx^n)}{2\,x^2} - \frac{ad}{2\,x^2}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
-b*e*n/x - b*e*log(c*x^n)/x - 1/4*b*d*n/x^2 - a*e/x - 1/2*b*d*log(c*x^n)/x
^2 - 1/2*a*d/x^2
```

3.7.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 57, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^3}\,dx = -\frac{(2\,benx+bdn)\log(x)}{2\,x^2} - \frac{4\,benx+4\,bex\log(c)+bdn+4\,aex+2\,bd\log(c)+2\,ad}{4\,x^2}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
-1/2*(2*b*e*n*x + b*d*n)*log(x)/x^2 - 1/4*(4*b*e*n*x + 4*b*e*x*log(c) + b*
d*n + 4*a*e*x + 2*b*d*log(c) + 2*a*d)/x^2
```

3.7.9 Mupad [B] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 47, normalized size of antiderivative = 0.78

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^3}\,dx = -\frac{a\,d+x\,(2\,a\,e+2\,b\,e\,n)+\frac{b\,d\,n}{2}}{2\,x^2} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d}{2}+b\,e\,x\right)}{x^2}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x))/x^3,x)
```

output
```
- (a*d + x*(2*a*e + 2*b*e*n) + (b*d*n)/2)/(2*x^2) - (log(c*x^n)*((b*d)/2 +
 b*e*x))/x^2
```

3.8 $\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx$

3.8.1 Optimal result

Integrand size = 19, antiderivative size = 57

$$\int \frac{(d+ex)\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{bdn}{9x^3} - \frac{ben}{4x^2} - \frac{d(a+b\log(cx^n))}{3x^3} - \frac{e(a+b\log(cx^n))}{2x^2}$$

output
```
-1/9*b*d*n/x^3-1/4*b*e*n/x^2-1/3*d*(a+b*ln(c*x^n))/x^3-1/2*e*(a+b*ln(c*x^n
))/x^2
```

3.8.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 47, normalized size of antiderivative = 0.82

$$\int \frac{(d+ex)\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{6a(2d+3ex)+bn(4d+9ex)+6b(2d+3ex)\log(cx^n)}{36x^3}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/36*(6*a*(2*d + 3*e*x) + b*n*(4*d + 9*e*x) + 6*b*(2*d + 3*e*x)*Log[c*x^n
])/x^3
```

3.8.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.211, Rules used = {2772, 27, 53, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int -\frac{2d+3ex}{6x^4}dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{6}bn\int \frac{2d+3ex}{x^4}dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{ 53}$$

$$\frac{1}{6}bn\int \left(\frac{2d}{x^4}+\frac{3e}{x^3}\right)dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{2x^2}+\frac{1}{6}bn\left(-\frac{2d}{3x^3}-\frac{3e}{2x^2}\right)$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*((-2*d)/(3*x^3) - (3*e)/(2*x^2)))/6 - (d*(a + b*Log[c*x^n]))/(3*x^3)
- (e*(a + b*Log[c*x^n]))/(2*x^2)
```

3.8.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 53
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && LeQ[7*m + 4*n + 4, 0])
|| LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.8.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 48, normalized size of antiderivative = 0.84

method	result
parallelrisch	$-\frac{18bex\ln(c\,x^n)+9benx+18aex+12b\ln(c\,x^n)d+4bdn+12ad}{36x^3}$
risch	$-\frac{b(3ex+2d)\ln(x^n)}{6x^3}-\frac{-9i\pi bex\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)+9i\pi bex\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2+9i\pi bex\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)}{}$

input
```
int((e*x+d)*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/36/x^3*(18*b*e*x*ln(c*x^n)+9*b*e*n*x+18*a*e*x+12*b*ln(c*x^n)*d+4*b*d*n+
12*a*d)
```

3.8.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)}{x^4}\,dx = -\frac{4\,bdn+12\,ad+9\,(ben+2\,ae)x+6\,(3\,bex+2\,bd)\log\left(c\right)+6\,(3\,benx+2\,bdn)\log\left(x\right)}{36\,x^3}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/36*(4*b*d*n + 12*a*d + 9*(b*e*n + 2*a*e)*x + 6*(3*b*e*x + 2*b*d)*log(c)
 + 6*(3*b*e*n*x + 2*b*d*n)*log(x))/x^3
```

3.8.6 Sympy [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx = -\frac{ad}{3x^3} - \frac{ae}{2x^2} - \frac{bdn}{9x^3} - \frac{bd\log(cx^n)}{3x^3} - \frac{ben}{4x^2} - \frac{be\log(cx^n)}{2x^2}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d/(3*x**3) - a*e/(2*x**2) - b*d*n/(9*x**3) - b*d*log(c*x**n)/(3*x**3) -
 b*e*n/(4*x**2) - b*e*log(c*x**n)/(2*x**2)
```

3.8.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx = -\frac{ben}{4\,x^2} - \frac{be\log(cx^n)}{2\,x^2} - \frac{bdn}{9\,x^3} - \frac{ae}{2\,x^2} - \frac{bd\log(cx^n)}{3\,x^3} - \frac{ad}{3\,x^3}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
-1/4*b*e*n/x^2 - 1/2*b*e*log(c*x^n)/x^2 - 1/9*b*d*n/x^3 - 1/2*a*e/x^2 - 1/
3*b*d*log(c*x^n)/x^3 - 1/3*a*d/x^3
```

3.8.8 Giac [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.04

$$\begin{aligned}\int \frac{(d+ex)(a+b\log(cx^n))}{x^4}\,dx &= -\frac{(3\,benx + 2\,bdn)\log(x)}{6\,x^3} \\ &\quad - \frac{9\,benx + 18\,bex\log(c) + 4\,bdn + 18\,aex + 12\,bd\log(c) + 12\,ad}{36\,x^3}\end{aligned}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
-1/6*(3*b*e*n*x + 2*b*d*n)*log(x)/x^3 - 1/36*(9*b*e*n*x + 18*b*e*x*log(c)
+ 4*b*d*n + 18*a*e*x + 12*b*d*log(c) + 12*a*d)/x^3
```

3.8.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.86

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})}{x^4}\,dx = -\frac{2\,a\,d+x\,\left(3\,a\,e+\frac{3\,b\,e\,n}{2}\right)+\frac{2\,b\,d\,n}{3}}{6\,x^3}-\frac{\ln{(c\,x^n)}\,\left(\frac{b\,d}{3}+\frac{b\,e\,x}{2}\right)}{x^3}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x))/x^4,x)
```

output
```
- (2*a*d + x*(3*a*e + (3*b*e*n)/2) + (2*b*d*n)/3)/(6*x^3) - (log(c*x^n)*((
b*d)/3 + (b*e*x)/2))/x^3
```

3.9 $\int x^3(d+ex)^2 (a+b\log(cx^n)) \, dx$

3.9.1 Optimal result

Integrand size = 21, antiderivative size = 74

$$\int x^3(d+ex)^2 (a+b\log(cx^n)) \, dx = -\frac{1}{16}bd^2nx^4 - \frac{2}{25}bdenx^5 - \frac{1}{36}be^2nx^6 + \frac{1}{60}\left(15d^2x^4+24dex^5+10e^2x^6\right)(a+b\log(cx^n))$$

output
```
-1/16*b*d^2*n*x^4-2/25*b*d*e*n*x^5-1/36*b*e^2*n*x^6+1/60*(10*e^2*x^6+24*d*
e*x^5+15*d^2*x^4)*(a+b*ln(c*x^n))
```

3.9.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 81, normalized size of antiderivative = 1.09

$$\int x^3(d+ex)^2 (a+b\log(cx^n)) \, dx = \frac{x^4(60a(15d^2+24dex+10e^2x^2)-bn(225d^2+288dex+100e^2x^2)+60b(15d^2+24dex+10e^2x^2)\log(cx^n}{3600}$$

input
```
Integrate[x^3*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(60*a*(15*d^2 + 24*d*e*x + 10*e^2*x^2) - b*n*(225*d^2 + 288*d*e*x + 1
00*e^2*x^2) + 60*b*(15*d^2 + 24*d*e*x + 10*e^2*x^2)*Log[c*x^n]))/3600
```

3.9.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex)^2\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \text{ 2771}$$

$$\frac{1}{60}\left(15d^2x^4+24dex^5+10e^2x^6\right)\left(a+b\log\left(cx^n\right)\right)-bn\int\frac{1}{60}x^3\left(15d^2+24exd+10e^2x^2\right)dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{60}\left(15d^2x^4+24dex^5+10e^2x^6\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{60}bn\int x^3\left(15d^2+24exd+10e^2x^2\right)dx$$

$$\Big\downarrow \text{ 1140}$$

$$\frac{1}{60}\left(15d^2x^4+24dex^5+10e^2x^6\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{60}bn\int\left(10e^2x^5+24dex^4+15d^2x^3\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{60}\left(15d^2x^4+24dex^5+10e^2x^6\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{60}bn\left(\frac{15d^2x^4}{4}+\frac{24}{5}dex^5+\frac{5e^2x^6}{3}\right)$$

input
```
Int[x^3*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/60*(b*n*((15*d^2*x^4)/4 + (24*d*e*x^5)/5 + (5*e^2*x^6)/3)) + ((15*d^2*x
^4 + 24*d*e*x^5 + 10*e^2*x^6)*(a + b*Log[c*x^n]))/60
```

3.9.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.9.4 Maple [A] (verified)

Time = 1.54 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^6 \ln(c\,x^n) b\,e^2}{6}-\frac{b\,e^2 n\,x^6}{36}+\frac{a\,e^2 x^6}{6}+\frac{2x^5 \ln(c\,x^n) bde}{5}-\frac{2bden\,x^5}{25}+\frac{2ade\,x^5}{5}+\frac{x^4 \ln(c\,x^n) b\,d^2}{4}-\frac{b\,d^2 n\,x^4}{16}+\frac{a\,d^2 x}{4}$
risch	$\frac{b\,x^4 (10e^2x^2+24dex+15d^2) \ln(x^n)}{60}-\frac{i\pi bde\,x^5 \operatorname{csgn}(ic\,x^n)^3}{5}+\frac{i\pi b\,e^2x^6 \operatorname{csgn}(ic) \operatorname{csgn}(ic\,x^n)^2}{12}+\frac{i\pi b\,d^2x^4 \operatorname{csgn}(ix^n) \operatorname{csgn}(ic}{8}$

input
```
int(x^3*(e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/6*x^6*ln(c*x^n)*b*e^2-1/36*b*e^2*n*x^6+1/6*a*e^2*x^6+2/5*x^5*ln(c*x^n)*b
*d*e-2/25*b*d*e*n*x^5+2/5*a*d*e*x^5+1/4*x^4*ln(c*x^n)*b*d^2-1/16*b*d^2*n*x
^4+1/4*a*d^2*x^4
```

3.9.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\begin{aligned}\int x^3(d+ex)^2\,(a+b\log{(cx^n)})\;dx=&-\frac{1}{36}\,(be^2n-6\,ae^2)x^6-\frac{2}{25}\,(bden-5\,ade)x^5\\&-\frac{1}{16}\,(bd^2n-4\,ad^2)x^4\\&+\frac{1}{60}\,\big(10\,be^2x^6+24\,bdex^5+15\,bd^2x^4\big)\log{(c)}\\&+\frac{1}{60}\,\big(10\,be^2nx^6+24\,bdenx^5+15\,bd^2nx^4\big)\log{(x)}\end{aligned}$$

input
```
integrate(x^3*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/36*(b*e^2*n - 6*a*e^2)*x^6 - 2/25*(b*d*e*n - 5*a*d*e)*x^5 - 1/16*(b*d^2
*n - 4*a*d^2)*x^4 + 1/60*(10*b*e^2*x^6 + 24*b*d*e*x^5 + 15*b*d^2*x^4)*log(
c) + 1/60*(10*b*e^2*n*x^6 + 24*b*d*e*n*x^5 + 15*b*d^2*n*x^4)*log(x)
```

3.9.6 Sympy [A] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.64

$$\int x^3(d+ex)^2\,(a+b\log{(cx^n)})\;dx=\frac{ad^2x^4}{4}+\frac{2adex^5}{5}+\frac{ae^2x^6}{6}-\frac{bd^2nx^4}{16}+\frac{bd^2x^4\log{(cx^n)}}{4}-\frac{2bdenx^5}{25}+\frac{2bdex^5\log{(cx^n)}}{5}-\frac{be^2nx^6}{36}+\frac{be^2x^6\log{(cx^n)}}{6}$$

input
```
integrate(x**3*(e*x+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**4/4 + 2*a*d*e*x**5/5 + a*e**2*x**6/6 - b*d**2*n*x**4/16 + b*d**2
*x**4*log(c*x**n)/4 - 2*b*d*e*n*x**5/25 + 2*b*d*e*x**5*log(c*x**n)/5 - b*e
**2*n*x**6/36 + b*e**2*x**6*log(c*x**n)/6
```

3.9.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x^3(d+ex)^2\,(a+b\log{(cx^n)})\;dx=-\frac{1}{36}\,be^2nx^6+\frac{1}{6}\,be^2x^6\log{(cx^n)}-\frac{2}{25}\,bdenx^5+\frac{1}{6}\,ae^2x^6+\frac{2}{5}\,bdex^5\log{(cx^n)}-\frac{1}{16}\,bd^2nx^4+\frac{2}{5}\,adex^5+\frac{1}{4}\,bd^2x^4\log{(cx^n)}+\frac{1}{4}\,ad^2x^4$$

input
```
integrate(x^3*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*e^2*n*x^6 + 1/6*b*e^2*x^6*log(c*x^n) - 2/25*b*d*e*n*x^5 + 1/6*a*e^
2*x^6 + 2/5*b*d*e*x^5*log(c*x^n) - 1/16*b*d^2*n*x^4 + 2/5*a*d*e*x^5 + 1/4*
b*d^2*x^4*log(c*x^n) + 1/4*a*d^2*x^4
```

3.9.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x^3(d+ex)^2(a+b\log(cx^n))\,dx = \frac{1}{6}be^2nx^6\log(x) - \frac{1}{36}be^2nx^6 + \frac{1}{6}be^2x^6\log(c) + \frac{2}{5}bdenx^5\log(x) - \frac{2}{25}bdenx^5 + \frac{1}{6}ae^2x^6 + \frac{2}{5}bdex^5\log(c) + \frac{1}{4}bd^2nx^4\log(x) - \frac{1}{16}bd^2nx^4 + \frac{2}{5}adex^5 + \frac{1}{4}bd^2x^4\log(c) + \frac{1}{4}ad^2x^4$$

input
```
integrate(x^3*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/6*b*e^2*n*x^6*log(x) - 1/36*b*e^2*n*x^6 + 1/6*b*e^2*x^6*log(c) + 2/5*b*d
*e*n*x^5*log(x) - 2/25*b*d*e*n*x^5 + 1/6*a*e^2*x^6 + 2/5*b*d*e*x^5*log(c)
+ 1/4*b*d^2*n*x^4*log(x) - 1/16*b*d^2*n*x^4 + 2/5*a*d*e*x^5 + 1/4*b*d^2*x^
4*log(c) + 1/4*a*d^2*x^4
```

3.9.9 Mupad [B] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x^3(d+ex)^2(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^2\,x^4}{4} + \frac{2\,b\,d\,e\,x^5}{5} + \frac{b\,e^2\,x^6}{6}\right) + \frac{d^2\,x^4\,(4\,a-b\,n)}{16} + \frac{e^2\,x^6\,(6\,a-b\,n)}{36} + \frac{2\,d\,e\,x^5\,(5\,a-b\,n)}{25}$$

input
```
int(x^3*(a + b*log(c*x^n))*(d + e*x)^2,x)
```

output
```
log(c*x^n)*((b*d^2*x^4)/4 + (b*e^2*x^6)/6 + (2*b*d*e*x^5)/5) + (d^2*x^4*(4
*a - b*n))/16 + (e^2*x^6*(6*a - b*n))/36 + (2*d*e*x^5*(5*a - b*n))/25
```

3.10 $\int x^2(d+ex)^2(a+b\log(cx^n))\,dx$

3.10.1 Optimal result

Integrand size = 21, antiderivative size = 74

$$\int x^2(d+ex)^2(a+b\log(cx^n))\,dx = -\frac{1}{9}bd^2nx^3-\frac{1}{8}bdenx^4-\frac{1}{25}be^2nx^5 + \frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)(a+b\log(cx^n))$$

output
```
-1/9*b*d^2*n*x^3-1/8*b*d*e*n*x^4-1/25*b*e^2*n*x^5+1/30*(6*e^2*x^5+15*d*e*x
^4+10*d^2*x^3)*(a+b*ln(c*x^n))
```

3.10.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 81, normalized size of antiderivative = 1.09

$$\int x^2(d+ex)^2(a+b\log(cx^n))\,dx = \frac{x^3(60a(10d^2+15dex+6e^2x^2)-bn(200d^2+225dex+72e^2x^2)+60b(10d^2+15dex+6e^2x^2)\log(cx^n))}{1800}$$

input
```
Integrate[x^2*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^3*(60*a*(10*d^2 + 15*d*e*x + 6*e^2*x^2) - b*n*(200*d^2 + 225*d*e*x + 72
*e^2*x^2) + 60*b*(10*d^2 + 15*d*e*x + 6*e^2*x^2)*Log[c*x^n]))/1800
```

3.10.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex)^2(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)(a+b\log(cx^n))-bn\int \frac{1}{30}x^2\left(10d^2+15exd+6e^2x^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)(a+b\log(cx^n))-\frac{1}{30}bn\int x^2\left(10d^2+15exd+6e^2x^2\right)dx$$

$$\Big\downarrow \text{1140}$$

$$\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)(a+b\log(cx^n))-\frac{1}{30}bn\int \left(6e^2x^4+15dex^3+10d^2x^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{30}\left(10d^2x^3+15dex^4+6e^2x^5\right)(a+b\log(cx^n))-\frac{1}{30}bn\left(\frac{10d^2x^3}{3}+\frac{15}{4}dex^4+\frac{6e^2x^5}{5}\right)$$

input
```
Int[x^2*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/30*(b*n*((10*d^2*x^3)/3 + (15*d*e*x^4)/4 + (6*e^2*x^5)/5)) + ((10*d^2*x
^3 + 15*d*e*x^4 + 6*e^2*x^5)*(a + b*Log[c*x^n]))/30
```

3.10.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.10.4 Maple [A] (verified)

Time = 0.61 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^5 b \ln(c\,x^n) e^2}{5} - \frac{b\,e^2 n\,x^5}{25} + \frac{x^5 a\,e^2}{5} + \frac{x^4 b \ln(c\,x^n) de}{2} - \frac{bden\,x^4}{8} + \frac{x^4 ade}{2} + \frac{x^3 b \ln(c\,x^n) d^2}{3} - \frac{b\,d^2 n\,x^3}{9} + \frac{a\,d^2 x^3}{3}$
risch	$\frac{b\,x^3 (6e^2x^2+15dex+10d^2) \ln(x^n)}{30} + \frac{i\pi b\,d^2 x^3 \operatorname{csgn}(ix^n) \operatorname{csgn}(ic\,x^n)^2}{6} - \frac{i\pi b\,d^2 x^3 \operatorname{csgn}(ic\,x^n)^3}{6} + \frac{i\pi b\,e^2 x^5 \operatorname{csgn}(ic) \operatorname{csgn}(ic\,x}{10}$

input
```
int(x^2*(e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/5*x^5*b*ln(c*x^n)*e^2-1/25*b*e^2*n*x^5+1/5*x^5*a*e^2+1/2*x^4*b*ln(c*x^n)
*d*e-1/8*b*d*e*n*x^4+1/2*x^4*a*d*e+1/3*x^3*b*ln(c*x^n)*d^2-1/9*b*d^2*n*x^3
+1/3*a*d^2*x^3
```

3.10.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\begin{aligned}\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx = & -\frac{1}{25}\left(be^2n-5\,ae^2\right)x^5 \\ & -\frac{1}{8}\left(bden-4\,ade\right)x^4-\frac{1}{9}\left(bd^2n-3\,ad^2\right)x^3 \\ & +\frac{1}{30}\left(6\,be^2x^5+15\,bdex^4+10\,bd^2x^3\right)\log\left(c\right) \\ & +\frac{1}{30}\left(6\,be^2nx^5+15\,bdenx^4+10\,bd^2nx^3\right)\log\left(x\right)\end{aligned}$$

input
```
integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/25*(b*e^2*n - 5*a*e^2)*x^5 - 1/8*(b*d*e*n - 4*a*d*e)*x^4 - 1/9*(b*d^2*n
 - 3*a*d^2)*x^3 + 1/30*(6*b*e^2*x^5 + 15*b*d*e*x^4 + 10*b*d^2*x^3)*log(c)
+ 1/30*(6*b*e^2*n*x^5 + 15*b*d*e*n*x^4 + 10*b*d^2*n*x^3)*log(x)
```

3.10.6 Sympy [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.57

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{ad^2x^3}{3}+\frac{adex^4}{2}+\frac{ae^2x^5}{5}-\frac{bd^2nx^3}{9}+\frac{bd^2x^3\log\left(cx^n\right)}{3}-\frac{bdenx^4}{8}+\frac{bdex^4\log\left(cx^n\right)}{2}-\frac{be^2nx^5}{25}+\frac{be^2x^5\log\left(cx^n\right)}{5}$$

input
```
integrate(x**2*(e*x+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**3/3 + a*d*e*x**4/2 + a*e**2*x**5/5 - b*d**2*n*x**3/9 + b*d**2*x*
*3*log(c*x**n)/3 - b*d*e*n*x**4/8 + b*d*e*x**4*log(c*x**n)/2 - b*e**2*n*x*
*5/25 + b*e**2*x**5*log(c*x**n)/5
```

3.10.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{25}\,be^2nx^5+\frac{1}{5}\,be^2x^5\log\left(cx^n\right)-\frac{1}{8}\,bdenx^4+\frac{1}{5}\,ae^2x^5+\frac{1}{2}\,bdex^4\log\left(cx^n\right)-\frac{1}{9}\,bd^2nx^3+\frac{1}{2}\,adex^4+\frac{1}{3}\,bd^2x^3\log\left(cx^n\right)+\frac{1}{3}\,ad^2x^3$$

input
```
integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*e^2*n*x^5 + 1/5*b*e^2*x^5*log(c*x^n) - 1/8*b*d*e*n*x^4 + 1/5*a*e^2
*x^5 + 1/2*b*d*e*x^4*log(c*x^n) - 1/9*b*d^2*n*x^3 + 1/2*a*d*e*x^4 + 1/3*b*
d^2*x^3*log(c*x^n) + 1/3*a*d^2*x^3
```

3.10.8 Giac [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x^2(d+ex)^2\,(a+b\log\,(cx^n))\,\,dx = \frac{1}{5}\,be^2nx^5\log\,(x) - \frac{1}{25}\,be^2nx^5 + \frac{1}{5}\,be^2x^5\log\,(c) + \frac{1}{2}\,bdenx^4\log\,(x) - \frac{1}{8}\,bdenx^4 + \frac{1}{5}\,ae^2x^5 + \frac{1}{2}\,bdex^4\log\,(c) + \frac{1}{3}\,bd^2nx^3\log\,(x) - \frac{1}{9}\,bd^2nx^3 + \frac{1}{2}\,adex^4 + \frac{1}{3}\,bd^2x^3\log\,(c) + \frac{1}{3}\,ad^2x^3$$

input
```
integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/5*b*e^2*n*x^5*log(x) - 1/25*b*e^2*n*x^5 + 1/5*b*e^2*x^5*log(c) + 1/2*b*d
*e*n*x^4*log(x) - 1/8*b*d*e*n*x^4 + 1/5*a*e^2*x^5 + 1/2*b*d*e*x^4*log(c) +
 1/3*b*d^2*n*x^3*log(x) - 1/9*b*d^2*n*x^3 + 1/2*a*d*e*x^4 + 1/3*b*d^2*x^3*
log(c) + 1/3*a*d^2*x^3
```

3.10.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x^2(d+ex)^2\,(a+b\log\,(cx^n))\,\,dx = \ln\,(c\,x^n)\,\left(\frac{b\,d^2\,x^3}{3} + \frac{b\,d\,e\,x^4}{2} + \frac{b\,e^2\,x^5}{5}\right) + \frac{d^2\,x^3\,(3\,a - b\,n)}{9} + \frac{e^2\,x^5\,(5\,a - b\,n)}{25} + \frac{d\,e\,x^4\,(4\,a - b\,n)}{8}$$

input
```
int(x^2*(a + b*log(c*x^n))*(d + e*x)^2,x)
```

output
```
log(c*x^n)*((b*d^2*x^3)/3 + (b*e^2*x^5)/5 + (b*d*e*x^4)/2) + (d^2*x^3*(3*a
 - b*n))/9 + (e^2*x^5*(5*a - b*n))/25 + (d*e*x^4*(4*a - b*n))/8
```

3.11 $\int x(d+ex)^2 (a+b\log(cx^n))\,dx$

3.11.1 Optimal result

Integrand size = 19, antiderivative size = 74

$$\int x(d+ex)^2 (a+b\log(cx^n))\,dx = -\frac{1}{4}bd^2nx^2 - \frac{2}{9}bdenx^3 - \frac{1}{16}be^2nx^4 + \frac{1}{12}(6d^2x^2+8dex^3+3e^2x^4)(a+b\log(cx^n))$$

output
```
-1/4*b*d^2*n*x^2-2/9*b*d*e*n*x^3-1/16*b*e^2*n*x^4+1/12*(3*e^2*x^4+8*d*e*x^
3+6*d^2*x^2)*(a+b*ln(c*x^n))
```

3.11.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 81, normalized size of antiderivative = 1.09

$$\int x(d+ex)^2 (a+b\log(cx^n))\,dx = \frac{1}{144}x^2\left(12a(6d^2+8dex+3e^2x^2) - bn(36d^2+32dex+9e^2x^2) + 12b(6d^2+8dex+3e^2x^2)\log(cx^n)\right)$$

input
```
Integrate[x*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(12*a*(6*d^2 + 8*d*e*x + 3*e^2*x^2) - b*n*(36*d^2 + 32*d*e*x + 9*e^2*
x^2) + 12*b*(6*d^2 + 8*d*e*x + 3*e^2*x^2)*Log[c*x^n]))/144
```

3.11.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 73, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.211, Rules used = {2771, 27, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex)^2 (a+b\log (cx^n)) \, dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)(a+b\log (cx^n))-bn\int \frac{1}{12}x\left(6d^2+8exd+3e^2x^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)(a+b\log (cx^n))-\frac{1}{12}bn\int x\left(6d^2+8exd+3e^2x^2\right)dx$$

$$\Big\downarrow \text{1140}$$

$$\frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)(a+b\log (cx^n))-\frac{1}{12}bn\int \left(3e^2x^3+8dex^2+6d^2x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{12}\left(6d^2x^2+8dex^3+3e^2x^4\right)(a+b\log (cx^n))-\frac{1}{12}bn\left(3d^2x^2+\frac{8}{3}dex^3+\frac{3e^2x^4}{4}\right)$$

input
```
Int[x*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/12*(b*n*(3*d^2*x^2 + (8*d*e*x^3)/3 + (3*e^2*x^4)/4)) + ((6*d^2*x^2 + 8*
d*e*x^3 + 3*e^2*x^4)*(a + b*Log[c*x^n]))/12
```

3.11.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.11.4 Maple [A] (verified)

Time = 0.86 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^{4} b \ln\left(c \,x^{n}\right) e^{2}}{4}-\frac{b \,e^{2} n \,x^{4}}{16}+\frac{x^{4} a \,e^{2}}{4}+\frac{2 x^{3} b \ln\left(c \,x^{n}\right) d e}{3}-\frac{2 b d e n \,x^{3}}{9}+\frac{2 x^{3} a d e}{3}+\frac{x^{2} b \ln\left(c \,x^{n}\right) d^{2}}{2}-\frac{b \,d^{2} n \,x^{2}}{4}+\frac{a \,d^{2} x^{2}}{2}$
risch	$\frac{b \,x^{2} \left(3 e^{2} x^{2}+8 d e x+6 d^{2}\right) \ln\left(x^{n}\right)}{12}-\frac{i \pi b \,d^{2} x^{2} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{4}+\frac{i \pi b d e \,x^{3} \operatorname{csgn}\left(i c\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}}{3}+\frac{i \pi b d e \,x^{3} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)}{3}$

input
```
int(x*(e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/4*x^4*b*ln(c*x^n)*e^2-1/16*b*e^2*n*x^4+1/4*x^4*a*e^2+2/3*x^3*b*ln(c*x^n)
*d*e-2/9*b*d*e*n*x^3+2/3*x^3*a*d*e+1/2*x^2*b*ln(c*x^n)*d^2-1/4*b*d^2*n*x^2
+1/2*a*d^2*x^2
```

3.11.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\begin{aligned}\int x(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx &= -\frac{1}{16}\left(be^2n-4\,ae^2\right)x^4\\ &\quad -\frac{2}{9}\left(bden-3\,ade\right)x^3-\frac{1}{4}\left(bd^2n-2\,ad^2\right)x^2\\ &\quad +\frac{1}{12}\left(3\,be^2x^4+8\,bdex^3+6\,bd^2x^2\right)\log\left(c\right)\\ &\quad +\frac{1}{12}\left(3\,be^2nx^4+8\,bdenx^3+6\,bd^2nx^2\right)\log\left(x\right)\end{aligned}$$

input
```
integrate(x*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/16*(b*e^2*n - 4*a*e^2)*x^4 - 2/9*(b*d*e*n - 3*a*d*e)*x^3 - 1/4*(b*d^2*n
 - 2*a*d^2)*x^2 + 1/12*(3*b*e^2*x^4 + 8*b*d*e*x^3 + 6*b*d^2*x^2)*log(c) +
1/12*(3*b*e^2*n*x^4 + 8*b*d*e*n*x^3 + 6*b*d^2*n*x^2)*log(x)
```

3.11.6 Sympy [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.64

$$\int x(d+ex)^2 (a+b\log(cx^n))\,dx = \frac{ad^2x^2}{2} + \frac{2adex^3}{3} + \frac{ae^2x^4}{4} - \frac{bd^2nx^2}{4} + \frac{bd^2x^2\log(cx^n)}{2} - \frac{2bdenx^3}{9} + \frac{2bdex^3\log(cx^n)}{3} - \frac{be^2nx^4}{16} + \frac{be^2x^4\log(cx^n)}{4}$$

input
```
integrate(x*(e*x+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**2/2 + 2*a*d*e*x**3/3 + a*e**2*x**4/4 - b*d**2*n*x**2/4 + b*d**2*
x**2*log(c*x**n)/2 - 2*b*d*e*n*x**3/9 + 2*b*d*e*x**3*log(c*x**n)/3 - b*e**
2*n*x**4/16 + b*e**2*x**4*log(c*x**n)/4
```

3.11.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x(d+ex)^2 (a+b\log(cx^n))\,dx = -\frac{1}{16}be^2nx^4 + \frac{1}{4}be^2x^4\log(cx^n) - \frac{2}{9}bdenx^3 + \frac{1}{4}ae^2x^4 + \frac{2}{3}bdex^3\log(cx^n) - \frac{1}{4}bd^2nx^2 + \frac{2}{3}adex^3 + \frac{1}{2}bd^2x^2\log(cx^n) + \frac{1}{2}ad^2x^2$$

input
```
integrate(x*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*e^2*n*x^4 + 1/4*b*e^2*x^4*log(c*x^n) - 2/9*b*d*e*n*x^3 + 1/4*a*e^2
*x^4 + 2/3*b*d*e*x^3*log(c*x^n) - 1/4*b*d^2*n*x^2 + 2/3*a*d*e*x^3 + 1/2*b*
d^2*x^2*log(c*x^n) + 1/2*a*d^2*x^2
```

3.11.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x(d+ex)^2 (a+b\log(cx^n))\, dx = \frac{1}{4}be^2nx^4\log(x) - \frac{1}{16}be^2nx^4 + \frac{1}{4}be^2x^4\log(c) + \frac{2}{3}bdenx^3\log(x) - \frac{2}{9}bdenx^3 + \frac{1}{4}ae^2x^4 + \frac{2}{3}bdex^3\log(c) + \frac{1}{2}bd^2nx^2\log(x) - \frac{1}{4}bd^2nx^2 + \frac{2}{3}adex^3 + \frac{1}{2}bd^2x^2\log(c) + \frac{1}{2}ad^2x^2$$

input
```
integrate(x*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*b*e^2*n*x^4*log(x) - 1/16*b*e^2*n*x^4 + 1/4*b*e^2*x^4*log(c) + 2/3*b*d
*e*n*x^3*log(x) - 2/9*b*d*e*n*x^3 + 1/4*a*e^2*x^4 + 2/3*b*d*e*x^3*log(c) +
 1/2*b*d^2*n*x^2*log(x) - 1/4*b*d^2*n*x^2 + 2/3*a*d*e*x^3 + 1/2*b*d^2*x^2*
log(c) + 1/2*a*d^2*x^2
```

3.11.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x(d+ex)^2 (a+b\log(cx^n))\, dx = \ln(c\,x^n)\left(\frac{b\,d^2\,x^2}{2} + \frac{2\,b\,d\,e\,x^3}{3} + \frac{b\,e^2\,x^4}{4}\right) + \frac{d^2\,x^2\,(2\,a-b\,n)}{4} + \frac{e^2\,x^4\,(4\,a-b\,n)}{16} + \frac{2\,d\,e\,x^3\,(3\,a-b\,n)}{9}$$

input
```
int(x*(a + b*log(c*x^n))*(d + e*x)^2,x)
```

output
```
log(c*x^n)*((b*d^2*x^2)/2 + (b*e^2*x^4)/4 + (2*b*d*e*x^3)/3) + (d^2*x^2*(2
*a - b*n))/4 + (e^2*x^4*(4*a - b*n))/16 + (2*d*e*x^3*(3*a - b*n))/9
```

3.12 $\int (d+ex)^2 (a+b\log(cx^n))\,dx$

3.12.1 Optimal result

Integrand size = 18, antiderivative size = 70

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx = -bd^2nx - \frac{1}{2}bdenx^2 - \frac{1}{9}be^2nx^3 - \frac{bd^3n\log(x)}{3e} + \frac{(d+ex)^3(a+b\log(cx^n))}{3e}$$

output
```
-b*d^2*n*x-1/2*b*d*e*n*x^2-1/9*b*e^2*n*x^3-1/3*b*d^3*n*ln(x)/e+1/3*(e*x+d)
^3*(a+b*ln(c*x^n))/e
```

3.12.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 77, normalized size of antiderivative = 1.10

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx = \frac{1}{18}x\left(6a\left(3d^2+3dex+e^2x^2\right) - bn\left(18d^2+9dex+2e^2x^2\right) + 6b\left(3d^2+3dex+e^2x^2\right)\log(cx^n)\right)$$

input
```
Integrate[(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x*(6*a*(3*d^2 + 3*d*e*x + e^2*x^2) - b*n*(18*d^2 + 9*d*e*x + 2*e^2*x^2) +
 6*b*(3*d^2 + 3*d*e*x + e^2*x^2)*Log[c*x^n]))/18
```

3.12.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 69, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$, Rules used = {2750, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2750}$$

$$\frac{(d+ex)^3 (a+b\log(cx^n))}{3e} - bn\int \frac{(d+ex)^3}{3ex}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{(d+ex)^3 (a+b\log(cx^n))}{3e} - \frac{bn\int \frac{(d+ex)^3}{x}dx}{3e}$$

$$\Big\downarrow \text{49}$$

$$\frac{(d+ex)^3 (a+b\log(cx^n))}{3e} - \frac{bn\int \left(\frac{d^3}{x}+3ed^2+3e^2xd+e^3x^2\right)dx}{3e}$$

$$\Big\downarrow \text{2009}$$

$$\frac{(d+ex)^3 (a+b\log(cx^n))}{3e} - \frac{bn\left(d^3\log(x)+3d^2ex+\frac{3}{2}de^2x^2+\frac{e^3x^3}{3}\right)}{3e}$$

input
```
Int[(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/3*(b*n*(3*d^2*e*x + (3*d*e^2*x^2)/2 + (e^3*x^3)/3 + d^3*Log[x]))/e + ((
d + e*x)^3*(a + b*Log[c*x^n]))/(3*e)
```

3.12.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

3.12.4 Maple [A] (verified)

Time = 0.40 (sec) , antiderivative size = 91, normalized size of antiderivative = 1.30

method	result
parallelrisch	$\frac{b\ln(c\,x^n)e^2x^3}{3}-\frac{b\,e^2n\,x^3}{9}+\frac{a\,e^2x^3}{3}+b\ln\left(c\,x^n\right)de\,x^2-\frac{bden\,x^2}{2}+ade\,x^2+xb\ln\left(c\,x^n\right)d^2-b\,d^2nx+$
risch	$\frac{(ex+d)^3b\ln(x^n)}{3e}+\frac{i\pi b\,d^2\operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2x}{2}-\frac{i\pi b\,d^2\operatorname{csgn}(ic\,x^n)^3x}{2}-\frac{ie\pi bd\,x^2\operatorname{csgn}(ic\,x^n)^3}{2}-\frac{i\pi b\,d^2\operatorname{csgn}(ic)\operatorname{csgn}(}{2}$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/3*b*ln(c*x^n)*e^2*x^3-1/9*b*e^2*n*x^3+1/3*a*e^2*x^3+b*ln(c*x^n)*d*e*x^2-
1/2*b*d*e*n*x^2+a*d*e*x^2+x*b*ln(c*x^n)*d^2-b*d^2*n*x+a*d^2*x
```

3.12.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.57

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx = -\frac{1}{9}(be^2n-3ae^2)x^3 - \frac{1}{2}(bden-2ade)x^2 - (bd^2n-ad^2)x + \frac{1}{3}(be^2x^3+3bdex^2+3bd^2x)\log(c) + \frac{1}{3}(be^2nx^3+3bdenx^2+3bd^2nx)\log(x)$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/9*(b*e^2*n - 3*a*e^2)*x^3 - 1/2*(b*d*e*n - 2*a*d*e)*x^2 - (b*d^2*n - a*
d^2)*x + 1/3*(b*e^2*x^3 + 3*b*d*e*x^2 + 3*b*d^2*x)*log(c) + 1/3*(b*e^2*n*x
^3 + 3*b*d*e*n*x^2 + 3*b*d^2*n*x)*log(x)
```

3.12.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 102, normalized size of antiderivative = 1.46

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx = ad^2x + adex^2 + \frac{ae^2x^3}{3} - bd^2nx + bd^2x\log(cx^n) - \frac{bdenx^2}{2} + bdex^2\log(cx^n) - \frac{be^2nx^3}{9} + \frac{be^2x^3\log(cx^n)}{3}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x + a*d*e*x**2 + a*e**2*x**3/3 - b*d**2*n*x + b*d**2*x*log(c*x**n)
- b*d*e*n*x**2/2 + b*d*e*x**2*log(c*x**n) - b*e**2*n*x**3/9 + b*e**2*x**3*
log(c*x**n)/3
```

3.12.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.29

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx = -\frac{1}{9}be^2nx^3 + \frac{1}{3}be^2x^3\log(cx^n) - \frac{1}{2}bdenx^2 + \frac{1}{3}ae^2x^3 + bdex^2\log(cx^n) - bd^2nx + adex^2 + bd^2x\log(cx^n) + ad^2x$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/9*b*e^2*n*x^3 + 1/3*b*e^2*x^3*log(c*x^n) - 1/2*b*d*e*n*x^2 + 1/3*a*e^2*
x^3 + b*d*e*x^2*log(c*x^n) - b*d^2*n*x + a*d*e*x^2 + b*d^2*x*log(c*x^n) +
a*d^2*x
```

3.12.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.56

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx = \frac{1}{3}be^2nx^3\log(x) - \frac{1}{9}be^2nx^3 + \frac{1}{3}be^2x^3\log(c) + bdenx^2\log(x) - \frac{1}{2}bdenx^2 + \frac{1}{3}ae^2x^3 + bdex^2\log(c) + bd^2nx\log(x) - bd^2nx + adex^2 + bd^2x\log(c) + ad^2x$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/3*b*e^2*n*x^3*log(x) - 1/9*b*e^2*n*x^3 + 1/3*b*e^2*x^3*log(c) + b*d*e*n*
x^2*log(x) - 1/2*b*d*e*n*x^2 + 1/3*a*e^2*x^3 + b*d*e*x^2*log(c) + b*d^2*n*
x*log(x) - b*d^2*n*x + a*d*e*x^2 + b*d^2*x*log(c) + a*d^2*x
```

3.12.9 Mupad [B] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.04

$$\int (d+ex)^2 (a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(b\,d^2\,x + b\,d\,e\,x^2 + \frac{b\,e^2\,x^3}{3}\right) + \frac{e^2\,x^3\,(3\,a-b\,n)}{9} + d^2\,x\,(a-b\,n) + \frac{d\,e\,x^2\,(2\,a-b\,n)}{2}$$

input
```
int((a + b*log(c*x^n))*(d + e*x)^2,x)
```

output
```
log(c*x^n)*((b*e^2*x^3)/3 + b*d^2*x + b*d*e*x^2) + (e^2*x^3*(3*a - b*n))/9
 + d^2*x*(a - b*n) + (d*e*x^2*(2*a - b*n))/2
```

3.12. $\int (d+ex)^2 (a+b\log(cx^n)) \, dx$

3.13 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x}\,dx$

3.13.1 Optimal result

Integrand size = 21, antiderivative size = 80

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x}\,dx = -\frac{1}{4}bn(4d+ex)^2 - \frac{1}{2}bd^2n\log^2(x) + 2dex(a+b\log(cx^n)) + \frac{1}{2}e^2x^2(a+b\log(cx^n)) + d^2\log(x)(a+b\log(cx^n))$$

output
```
-1/4*b*n*(e*x+4*d)^2-1/2*b*d^2*n*ln(x)^2+2*d*e*x*(a+b*ln(c*x^n))+1/2*e^2*x
^2*(a+b*ln(c*x^n))+d^2*ln(x)*(a+b*ln(c*x^n))
```

3.13.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 83, normalized size of antiderivative = 1.04

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x}\,dx = 2adex - 2bdenx - \frac{1}{4}be^2nx^2 + 2bdex\log(cx^n) + \frac{1}{2}e^2x^2(a+b\log(cx^n)) + \frac{d^2(a+b\log(cx^n))^2}{2bn}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
2*a*d*e*x - 2*b*d*e*n*x - (b*e^2*n*x^2)/4 + 2*b*d*e*x*Log[c*x^n] + (e^2*x^
2*(a + b*Log[c*x^n]))/2 + (d^2*(a + b*Log[c*x^n])^2)/(2*b*n)
```

3.13.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 81, normalized size of antiderivative = 1.01, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(\frac{\log(x)d^2}{x}+\frac{1}{2}e(4d+ex)\right)dx+d^2\log(x)\left(a+b\log\left(cx^n\right)\right)+2dex(a+b\log\left(cx^n\right))+\frac{1}{2}e^2x^2(a+b\log\left(cx^n\right))$$

$$\Big\downarrow \text{2009}$$

$$d^2\log(x)\left(a+b\log\left(cx^n\right)\right)+2dex(a+b\log\left(cx^n\right))+\frac{1}{2}e^2x^2(a+b\log\left(cx^n\right))-bn\left(\frac{1}{2}d^2\log^2(x)+\frac{1}{4}(4d+ex)^2\right)$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
-(b*n*((4*d + e*x)^2/4 + (d^2*Log[x]^2)/2)) + 2*d*e*x*(a + b*Log[c*x^n]) +
 (e^2*x^2*(a + b*Log[c*x^n]))/2 + d^2*Log[x]*(a + b*Log[c*x^n])
```

3.13.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.13.4 Maple [A] (verified)

Time = 0.62 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{2x^2\ln(c\,x^n)b\,e^2n-x^2b\,e^2n^2+2x^2a\,e^2n+8x\ln(c\,x^n)bden-8xbde\,n^2+4\ln(x)a\,d^2n+8xaden+2b\,d^2\ln(c\,x^n)^2}{4n}$
risch	$\left(\frac{x^2b\,e^2}{2}+2bdex+b\,d^2\ln(x)\right)\ln(x^n)-\frac{b\,d^2n\ln(x)^2}{2}+\frac{i\ln(x)\pi b\,d^2\operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2}{2}+\frac{i\pi b\,e^2x^2\operatorname{csgn}(ic)}{4}$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/4*(2*x^2*ln(c*x^n)*b*e^2*n-x^2*b*e^2*n^2+2*x^2*a*e^2*n+8*x*ln(c*x^n)*b*d
*e*n-8*x*b*d*e*n^2+4*ln(x)*a*d^2*n+8*x*a*d*e*n+2*b*d^2*ln(c*x^n)^2)/n
```

3.13.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 98, normalized size of antiderivative = 1.22

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x}\,dx = \frac{1}{2}\,bd^2n\log(x)^2-\frac{1}{4}\left(be^2n-2\,ae^2\right)x^2-2\,(bden-ade)x+\frac{1}{2}\left(be^2x^2+4\,bdex\right)\log(c)+\frac{1}{2}\left(be^2nx^2+4\,bdenx+2\,bd^2\log(c)+2\,ad^2\right)\log(x)$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*b*d^2*n*log(x)^2 - 1/4*(b*e^2*n - 2*a*e^2)*x^2 - 2*(b*d*e*n - a*d*e)*x
 + 1/2*(b*e^2*x^2 + 4*b*d*e*x)*log(c) + 1/2*(b*e^2*n*x^2 + 4*b*d*e*n*x + 2
*b*d^2*log(c) + 2*a*d^2)*log(x)
```

3.13.6 Sympy [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.64

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x}\,dx = \begin{cases} \frac{ad^2\log(cx^n)}{n} + 2adex + \frac{ae^2x^2}{2} + \frac{bd^2\log(cx^n)^2}{2n} - 2bdenx + 2bdex\log(cx^n) - \frac{be^2nx^2}{4} + \frac{be^2x^2\log(cx^n)}{2} & \text{for } n \neq 0 \\ (a+b\log(c))\left(d^2\log(x) + 2dex + \frac{e^2x^2}{2}\right) & \text{otherwise} \end{cases}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise((a*d**2*log(c*x**n)/n + 2*a*d*e*x + a*e**2*x**2/2 + b*d**2*log(c
*x**n)**2/(2*n) - 2*b*d*e*n*x + 2*b*d*e*x*log(c*x**n) - b*e**2*n*x**2/4 +
b*e**2*x**2*log(c*x**n)/2, Ne(n, 0)), ((a + b*log(c))*(d**2*log(x) + 2*d*e
*x + e**2*x**2/2), True))
```

3.13.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 84, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x}\,dx = -\frac{1}{4}\,be^2nx^2 + \frac{1}{2}\,be^2x^2\log(cx^n) - 2\,bdenx + \frac{1}{2}\,ae^2x^2 + 2\,bdex\log(cx^n) + 2\,adex + \frac{bd^2\log(cx^n)^2}{2\,n} + ad^2\log(x)$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
-1/4*b*e^2*n*x^2 + 1/2*b*e^2*x^2*log(c*x^n) - 2*b*d*e*n*x + 1/2*a*e^2*x^2
+ 2*b*d*e*x*log(c*x^n) + 2*a*d*e*x + 1/2*b*d^2*log(c*x^n)^2/n + a*d^2*log(
x)
```

3.13.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x}\,dx = \frac{1}{2}\,bd^2n\log(x)^2 - \frac{1}{4}\left(be^2n - 2\,be^2\log(c) - 2\,ae^2\right)x^2 - 2\left(bden - bde\log(c) - ade\right)x + \frac{1}{2}\left(be^2nx^2 + 4\,bdenx\right)\log(x) + \left(bd^2\log(c) + ad^2\right)\log(x)$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
1/2*b*d^2*n*log(x)^2 - 1/4*(b*e^2*n - 2*b*e^2*log(c) - 2*a*e^2)*x^2 - 2*(b
*d*e*n - b*d*e*log(c) - a*d*e)*x + 1/2*(b*e^2*n*x^2 + 4*b*d*e*n*x)*log(x)
+ (b*d^2*log(c) + a*d^2)*log(x)
```

3.13.9 Mupad [B] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 75, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x}\,dx = \ln(c\,x^n)\left(\frac{b\,e^2\,x^2}{2} + 2\,b\,d\,e\,x\right) + \frac{e^2\,x^2\,(2\,a - b\,n)}{4} + a\,d^2\,\ln(x) + \frac{b\,d^2\ln(c\,x^n)^2}{2\,n} + 2\,d\,e\,x\,(a - b\,n)$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^2)/x,x)
```

output
```
log(c*x^n)*((b*e^2*x^2)/2 + 2*b*d*e*x) + (e^2*x^2*(2*a - b*n))/4 + a*d^2*l
og(x) + (b*d^2*log(c*x^n)^2)/(2*n) + 2*d*e*x*(a - b*n)
```

3.14 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^2} dx$

3.14.1 Optimal result

Integrand size = 21, antiderivative size = 78

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^2n}{x} - be^2nx - bden\log^2(x) - \frac{d^2(a+b\log(cx^n))}{x} + e^2x(a+b\log(cx^n)) + 2de\log(x)\,(a+b\log(cx^n))$$

output
```
-b*d^2*n/x-b*e^2*n*x-b*d*e*n*ln(x)^2-d^2*(a+b*ln(c*x^n))/x+e^2*x*(a+b*ln(c
*x^n))+2*d*e*ln(x)*(a+b*ln(c*x^n))
```

3.14.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 76, normalized size of antiderivative = 0.97

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^2n}{x} + ae^2x - be^2nx + be^2x\log(cx^n) - \frac{d^2(a+b\log(cx^n))}{x} + \frac{de(a+b\log(cx^n))^2}{bn}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((b*d^2*n)/x) + a*e^2*x - b*e^2*n*x + b*e^2*x*Log[c*x^n] - (d^2*(a + b*Lo
g[c*x^n]))/x + (d*e*(a + b*Log[c*x^n])^2)/(b*n)
```

3.14.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 74, normalized size of antiderivative = 0.95, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^2} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn \int \left(-\frac{d^2}{x^2}+\frac{2e\log(x)d}{x}+e^2\right)dx-\frac{d^2(a+b\log(cx^n))}{x}+2de\log(x)(a+b\log(cx^n))+e^2x(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{x}+2de\log(x)(a+b\log(cx^n))+e^2x(a+b\log(cx^n))-bn\left(\frac{d^2}{x}+de\log^2(x)+e^2x\right)$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-(b*n*(d^2/x + e^2*x + d*e*Log[x]^2)) - (d^2*(a + b*Log[c*x^n]))/x + e^2*x
*(a + b*Log[c*x^n]) + 2*d*e*Log[x]*(a + b*Log[c*x^n])
```

3.14.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.14.4 Maple [A] (verified)

Time = 0.45 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.23

method	result
parallelrisch	$\frac{x^2 \ln(c\,x^n) b\,e^2 n - x^2 b\,e^2 n^2 + 2\ln(x) x a d e n + x^2 a\,e^2 n + b d e \ln(c\,x^n)^2 x - \ln(c\,x^n) b\,d^2 n - b\,d^2 n^2 - a\,d^2 n}{x n}$
risch	$-\frac{b(-2dex\ln(x) - e^2x^2 + d^2)\ln(x^n)}{x} - \frac{-2i\ln(x)\pi bde\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2 x + i\pi b\,d^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2 + i\pi b\,e^2 x^2\,\mathrm{csgn}(ic}$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
1/x*(x^2*ln(c*x^n)*b*e^2*n-x^2*b*e^2*n^2+2*ln(x)*x*a*d*e*n+x^2*a*e^2*n+b*d
*e*ln(c*x^n)^2*x-ln(c*x^n)*b*d^2*n-b*d^2*n^2-a*d^2*n)/n
```

3.14.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 98, normalized size of antiderivative = 1.26

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^2}\,dx$$
$$= \frac{bdenx\log(x)^2 - bd^2n - ad^2 - (be^2n - ae^2)x^2 + (be^2x^2 - bd^2)\log(c) + (be^2nx^2 + 2\,bdex\log(c) - bd^2n +}{x}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
(b*d*e*n*x*log(x)^2 - b*d^2*n - a*d^2 - (b*e^2*n - a*e^2)*x^2 + (b*e^2*x^2
 - b*d^2)*log(c) + (b*e^2*n*x^2 + 2*b*d*e*x*log(c) - b*d^2*n + 2*a*d*e*x)*
log(x))/x
```

3.14.6 Sympy [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.44

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^2}\,dx$$
$$= \begin{cases} -\frac{ad^2}{x} + \frac{2ade\log(cx^n)}{n} + ae^2x - \frac{bd^2n}{x} - \frac{bd^2\log(cx^n)}{x} + \frac{bde\log(cx^n)^2}{n} - be^2nx + be^2x\log(cx^n) & \text{for } n \neq 0 \\ (a+b\log(c))\left(-\frac{d^2}{x} + 2de\log(x) + e^2x\right) & \text{otherwise} \end{cases}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**2,x)
```

output
```
Piecewise((-a*d**2/x + 2*a*d*e*log(c*x**n)/n + a*e**2*x - b*d**2*n/x - b*d
**2*log(c*x**n)/x + b*d*e*log(c*x**n)**2/n - b*e**2*n*x + b*e**2*x*log(c*x
**n), Ne(n, 0)), ((a + b*log(c))*(-d**2/x + 2*d*e*log(x) + e**2*x), True))
```

3.14.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 83, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^2}\,dx = -be^2nx + be^2x\log(cx^n) + ae^2x + \frac{bde\log(cx^n)^2}{n} + 2\,ade\log(x) - \frac{bd^2n}{x} - \frac{bd^2\log(cx^n)}{x} - \frac{ad^2}{x}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
-b*e^2*n*x + b*e^2*x*log(c*x^n) + a*e^2*x + b*d*e*log(c*x^n)^2/n + 2*a*d*e
*log(x) - b*d^2*n/x - b*d^2*log(c*x^n)/x - a*d^2/x
```

3.14.8 Giac [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 93, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^2}\,dx = bden\log(x)^2 + (x\log(x)-x)be^2n - bd^2n\left(\frac{\log(x)}{x} + \frac{1}{x}\right) + be^2x\log(c) + 2\,bde\log(c)\log(|x|) + ae^2x + 2\,ade\log(|x|) - \frac{bd^2\log(c)}{x} - \frac{ad^2}{x}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
b*d*e*n*log(x)^2 + (x*log(x) - x)*b*e^2*n - b*d^2*n*(log(x)/x + 1/x) + b*e
^2*x*log(c) + 2*b*d*e*log(c)*log(abs(x)) + a*e^2*x + 2*a*d*e*log(abs(x)) -
 b*d^2*log(c)/x - a*d^2/x
```

3.14.9 Mupad [B] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 99, normalized size of antiderivative = 1.27

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^2}\,dx = \ln(x)\,\left(2\,a\,d\,e+2\,b\,d\,e\,n\right)-\frac{a\,d^2+b\,d^2\,n}{x} - \ln(c\,x^n)\,\left(\frac{b\,d^2+2\,b\,d\,e\,x+b\,e^2\,x^2}{x}-2\,b\,e^2\,x\right) + e^2\,x\,(a-b\,n)+\frac{b\,d\,e\ln(c\,x^n)^2}{n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^2)/x^2,x)
```

output
```
log(x)*(2*a*d*e + 2*b*d*e*n) - (a*d^2 + b*d^2*n)/x - log(c*x^n)*((b*d^2 +
b*e^2*x^2 + 2*b*d*e*x)/x - 2*b*e^2*x) + e^2*x*(a - b*n) + (b*d*e*log(c*x^n
)^2)/n
```

3.15 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^3}\,dx$

3.15.1 Optimal result

Integrand size = 21, antiderivative size = 84

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{bn(d+4ex)^2}{4x^2}-\frac{1}{2}be^2n\log^2(x)-\frac{d^2(a+b\log(cx^n))}{2x^2} -\frac{2de(a+b\log(cx^n))}{x}+e^2\log(x)\,(a+b\log(cx^n))$$

output
```
-1/4*b*n*(4*e*x+d)^2/x^2-1/2*b*e^2*n*ln(x)^2-1/2*d^2*(a+b*ln(c*x^n))/x^2-2
*d*e*(a+b*ln(c*x^n))/x+e^2*ln(x)*(a+b*ln(c*x^n))
```

3.15.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 84, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{bd^2n}{4x^2}-\frac{2bden}{x}-\frac{d^2(a+b\log(cx^n))}{2x^2} -\frac{2de(a+b\log(cx^n))}{x}+\frac{e^2(a+b\log(cx^n))^2}{2bn}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/4*(b*d^2*n)/x^2 - (2*b*d*e*n)/x - (d^2*(a + b*Log[c*x^n]))/(2*x^2) - (2
*d*e*(a + b*Log[c*x^n]))/x + (e^2*(a + b*Log[c*x^n])^2)/(2*b*n)
```

3.15.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 85, normalized size of antiderivative = 1.01, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^3} \, dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn \int \left(\frac{e^2\log(x)}{x} - \frac{d(d+4ex)}{2x^3}\right)dx - \frac{d^2(a+b\log(cx^n))}{2x^2} - \frac{2de(a+b\log(cx^n))}{x} + e^2\log(x)\,(a+b\log(cx^n))$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{2x^2} - \frac{2de(a+b\log(cx^n))}{x} + e^2\log(x)\,(a+b\log(cx^n)) - bn\left(\frac{(d+4ex)^2}{4x^2} + \frac{1}{2}e^2\log^2(x)\right)$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-(b*n*((d + 4*e*x)^2/(4*x^2) + (e^2*Log[x]^2)/2)) - (d^2*(a + b*Log[c*x^n]
))/(2*x^2) - (2*d*e*(a + b*Log[c*x^n]))/x + e^2*Log[x]*(a + b*Log[c*x^n])
```

3.15.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.15.4 Maple [A] (verified)

Time = 0.61 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.15

method	result
parallelrisch	$\frac{4\ln(x)x^2 a e^2 n+2e^2 b\ln(c x^n)^2 x^2-8x\ln(c x^n)bden-8xbde n^2-8xaden-2\ln(c x^n)b d^2 n-b d^2 n^2-2a d^2 n}{4x^2 n}$
risch	$-\frac{b(-2e^2\ln(x)x^2+4dex+d^2)\ln(x^n)}{2x^2}-\frac{-2i\ln(x)\pi b e^2 \operatorname{csgn}(ic)\operatorname{csgn}(ic x^n)^2 x^2+4i\pi bdex\ \operatorname{csgn}(ix^n)\operatorname{csgn}(ic x^n)^2+4i\pi bdex\ \text{cs}}{}$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/4/x^2*(4*ln(x)*x^2*a*e^2*n+2*e^2*b*ln(c*x^n)^2*x^2-8*x*ln(c*x^n)*b*d*e*n
-8*x*b*d*e*n^2-8*x*a*d*e*n-2*ln(c*x^n)*b*d^2*n-b*d^2*n^2-2*a*d^2*n)/n
```

3.15.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^3}\,dx$$
$$=\frac{2\,be^2nx^2\log(x)^2-bd^2n-2\,ad^2-8\,(bden+ade)x-2\,(4\,bdex+bd^2)\log(c)+2\,(2\,be^2x^2\log(c)-4\,bdenx}{4\,x^2}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
1/4*(2*b*e^2*n*x^2*log(x)^2 - b*d^2*n - 2*a*d^2 - 8*(b*d*e*n + a*d*e)*x -
2*(4*b*d*e*x + b*d^2)*log(c) + 2*(2*b*e^2*x^2*log(c) - 4*b*d*e*n*x + 2*a*e
^2*x^2 - b*d^2*n)*log(x))/x^2
```

3.15.6 Sympy [A] (verification not implemented)

Time = 2.07 (sec) , antiderivative size = 99, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^3}\,dx = -\frac{ad^2}{2x^2}-\frac{2ade}{x}+ae^2\log(x) + bd^2\left(-\frac{n}{4x^2}-\frac{\log(cx^n)}{2x^2}\right)+2bde\left(-\frac{n}{x}-\frac{\log(cx^n)}{x}\right) - be^2\left(\begin{cases}-\log(c)\log(x) & \text{for } n=0\\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise}\end{cases}\right)$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**3,x)
```

output
```
-a*d**2/(2*x**2) - 2*a*d*e/x + a*e**2*log(x) + b*d**2*(-n/(4*x**2) - log(c
*x**n)/(2*x**2)) + 2*b*d*e*(-n/x - log(c*x**n)/x) - b*e**2*Piecewise((-log
(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

3.15.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.07

$$\int \frac{(d+ex)^2\,(a+b\log{(cx^n)})}{x^3}\,dx = \frac{be^2\log{(cx^n)}^2}{2\,n} + ae^2\log{(x)} - \frac{2\,bden}{x} - \frac{2\,bde\log{(cx^n)}}{x} - \frac{bd^2n}{4\,x^2} - \frac{2\,ade}{x} - \frac{bd^2\log{(cx^n)}}{2\,x^2} - \frac{ad^2}{2\,x^2}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
1/2*b*e^2*log(c*x^n)^2/n + a*e^2*log(x) - 2*b*d*e*n/x - 2*b*d*e*log(c*x^n)
/x - 1/4*b*d^2*n/x^2 - 2*a*d*e/x - 1/2*b*d^2*log(c*x^n)/x^2 - 1/2*a*d^2/x^
2
```

3.15.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 102, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex)^2\,(a+b\log{(cx^n)})}{x^3}\,dx = \frac{1}{2}\,be^2n\log{(x)}^2 - 2\,bden\left(\frac{\log{(x)}}{x} + \frac{1}{x}\right) - \frac{1}{4}\,bd^2n\left(\frac{2\,\log{(x)}}{x^2} + \frac{1}{x^2}\right) + be^2\log{(c)}\log{(|x|)} + ae^2\log{(|x|)} - \frac{2\,bde\log{(c)}}{x} - \frac{2\,ade}{x} - \frac{bd^2\log{(c)}}{2\,x^2} - \frac{ad^2}{2\,x^2}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
1/2*b*e^2*n*log(x)^2 - 2*b*d*e*n*(log(x)/x + 1/x) - 1/4*b*d^2*n*(2*log(x)/
x^2 + 1/x^2) + b*e^2*log(c)*log(abs(x)) + a*e^2*log(abs(x)) - 2*b*d*e*log(
c)/x - 2*a*d*e/x - 1/2*b*d^2*log(c)/x^2 - 1/2*a*d^2/x^2
```

3.15.9 Mupad [B] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 99, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^3}\,dx = \ln(x)\left(a\,e^2+\frac{3\,b\,e^2\,n}{2}\right) - \frac{a\,d^2+x\,(4\,a\,d\,e+4\,b\,d\,e\,n)+\frac{b\,d^2\,n}{2}}{2\,x^2} - \frac{\ln(c\,x^n)\left(\frac{b\,d^2}{2}+2\,b\,d\,e\,x+\frac{3\,b\,e^2\,x^2}{2}\right)}{x^2} + \frac{b\,e^2\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^2)/x^3,x)
```

output
```
log(x)*(a*e^2 + (3*b*e^2*n)/2) - (a*d^2 + x*(4*a*d*e + 4*b*d*e*n) + (b*d^2
*n)/2)/(2*x^2) - (log(c*x^n)*((b*d^2)/2 + (3*b*e^2*x^2)/2 + 2*b*d*e*x))/x^
2 + (b*e^2*log(c*x^n)^2)/(2*n)
```

3.16 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^4}\,dx$

3.16.1 Optimal result

Integrand size = 21, antiderivative size = 75

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^4}\,dx = -\frac{bd^2n}{9x^3}-\frac{bden}{2x^2}-\frac{be^2n}{x}+\frac{be^3n\log(x)}{3d}-\frac{(d+ex)^3(a+b\log(cx^n))}{3dx^3}$$

output
```
-1/9*b*d^2*n/x^3-1/2*b*d*e*n/x^2-b*e^2*n/x+1/3*b*e^3*n*ln(x)/d-1/3*(e*x+d)
^3*(a+b*ln(c*x^n))/d/x^3
```

3.16.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 76, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^4}\,dx = -\frac{6a(d^2+3dex+3e^2x^2)+bn(2d^2+9dex+18e^2x^2)+6b(d^2+3dex+3e^2x^2)\log(cx^n)}{18x^3}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/18*(6*a*(d^2 + 3*d*e*x + 3*e^2*x^2) + b*n*(2*d^2 + 9*d*e*x + 18*e^2*x^2
) + 6*b*(d^2 + 3*d*e*x + 3*e^2*x^2)*Log[c*x^n])/x^3
```

3.16.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 74, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2772, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^4} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{(d+ex)^3}{3dx^4}dx-\frac{(d+ex)^3 (a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(d+ex)^3}{x^4}dx}{3d}-\frac{(d+ex)^3 (a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{49}$$

$$\frac{bn\int \left(\frac{d^3}{x^4}+\frac{3ed^2}{x^3}+\frac{3e^2d}{x^2}+\frac{e^3}{x}\right)dx}{3d}-\frac{(d+ex)^3 (a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(-\frac{d^3}{3x^3}-\frac{3d^2e}{2x^2}-\frac{3de^2}{x}+e^3\log(x)\right)}{3d}-\frac{(d+ex)^3 (a+b\log(cx^n))}{3dx^3}$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-1/3*d^3/x^3 - (3*d^2*e)/(2*x^2) - (3*d*e^2)/x + e^3*Log[x]))/(3*d)
- ((d + e*x)^3*(a + b*Log[c*x^n]))/(3*d*x^3)
```

3.16.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.16.4 Maple [A] (verified)

Time = 0.59 (sec) , antiderivative size = 91, normalized size of antiderivative = 1.21

method	result
parallelrisch	$-\frac{18 b \ln\left(c\,x^{n}\right) e^{2} x^{2}+18 b\,e^{2} n\,x^{2}+18 a\,e^{2} x^{2}+18 b \ln\left(c\,x^{n}\right) d e x+9 b d e n x+18 a d e x+6 b \ln\left(c\,x^{n}\right) d^{2}+2 b\,d^{2} n+6 a\,d^{2}}{18 x^{3}}$
risch	$-\frac{b\left(3 e^{2} x^{2}+3 d e x+d^{2}\right) \ln\left(x^{n}\right)}{3 x^{3}}-\frac{9 i \pi b\,e^{2} x^{2} \operatorname{csgn}\left(i c\right) \operatorname{csgn}\left(i c\,x^{n}\right)^{2}+9 i \pi b\,e^{2} x^{2} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right)^{2}-9 i \pi b\,e^{2} x^{2} \operatorname{csgn}\left(i c\,x^{n}\right)^{3}-$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/18/x^3*(18*b*ln(c*x^n)*e^2*x^2+18*b*e^2*n*x^2+18*a*e^2*x^2+18*b*ln(c*x^
n)*d*e*x+9*b*d*e*n*x+18*a*d*e*x+6*b*ln(c*x^n)*d^2+2*b*d^2*n+6*a*d^2)
```

3.16.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.37

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^4}\,dx = -\frac{2\,bd^2n + 6\,ad^2 + 18\,(be^2n + ae^2)x^2 + 9\,(bden + 2\,ade)x + 6\,(3\,be^2x^2 + 3\,bdex + bd^2)\log(c) + 6\,(3\,be^2nx}{18\,x^3}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/18*(2*b*d^2*n + 6*a*d^2 + 18*(b*e^2*n + a*e^2)*x^2 + 9*(b*d*e*n + 2*a*d
*e)*x + 6*(3*b*e^2*x^2 + 3*b*d*e*x + b*d^2)*log(c) + 6*(3*b*e^2*n*x^2 + 3*
b*d*e*n*x + b*d^2*n)*log(x))/x^3
```

3.16.6 Sympy [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.39

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^4}\,dx = -\frac{ad^2}{3x^3} - \frac{ade}{x^2} - \frac{ae^2}{x} - \frac{bd^2n}{9x^3} - \frac{bd^2\log(cx^n)}{3x^3} - \frac{bden}{2x^2} - \frac{bde\log(cx^n)}{x^2} - \frac{be^2n}{x} - \frac{be^2\log(cx^n)}{x}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d**2/(3*x**3) - a*d*e/x**2 - a*e**2/x - b*d**2*n/(9*x**3) - b*d**2*log(
c*x**n)/(3*x**3) - b*d*e*n/(2*x**2) - b*d*e*log(c*x**n)/x**2 - b*e**2*n/x
- b*e**2*log(c*x**n)/x
```

3.16.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.33

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^4}\,dx = -\frac{be^2n}{x} - \frac{be^2\log(cx^n)}{x} - \frac{bden}{2\,x^2} - \frac{ae^2}{x} - \frac{bde\log(cx^n)}{x^2} - \frac{bd^2n}{9\,x^3} - \frac{ade}{x^2} - \frac{bd^2\log(cx^n)}{3\,x^3} - \frac{ad^2}{3\,x^3}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
-b*e^2*n/x - b*e^2*log(c*x^n)/x - 1/2*b*d*e*n/x^2 - a*e^2/x - b*d*e*log(c*
x^n)/x^2 - 1/9*b*d^2*n/x^3 - a*d*e/x^2 - 1/3*b*d^2*log(c*x^n)/x^3 - 1/3*a*
d^2/x^3
```

3.16.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.47

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^4}\,dx = -\frac{(3\,be^2nx^2+3\,bdenx+bd^2n)\log(x)}{3\,x^3} - \frac{18\,be^2nx^2+18\,be^2x^2\log(c)+9\,bdenx+18\,ae^2x^2+18\,bdex\log(c)+2\,bd^2n+18\,adex+6\,bd^2\log(c)+}{18\,x^3}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
-1/3*(3*b*e^2*n*x^2 + 3*b*d*e*n*x + b*d^2*n)*log(x)/x^3 - 1/18*(18*b*e^2*n
*x^2 + 18*b*e^2*x^2*log(c) + 9*b*d*e*n*x + 18*a*e^2*x^2 + 18*b*d*e*x*log(c
) + 2*b*d^2*n + 18*a*d*e*x + 6*b*d^2*log(c) + 6*a*d^2)/x^3
```

3.16.9 Mupad [B] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.09

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^4}\,dx = -\frac{x^2\,(3\,a\,e^2+3\,b\,e^2\,n)+a\,d^2+x\,\left(3\,a\,d\,e+\frac{3\,b\,d\,e\,n}{2}\right)+\frac{b\,d^2\,n}{3}}{3\,x^3} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d^2}{3}+b\,d\,e\,x+b\,e^2\,x^2\right)}{x^3}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^2)/x^4,x)
```

output
```
- (x^2*(3*a*e^2 + 3*b*e^2*n) + a*d^2 + x*(3*a*d*e + (3*b*d*e*n)/2) + (b*d^
2*n)/3)/(3*x^3) - (log(c*x^n)*((b*d^2)/3 + b*e^2*x^2 + b*d*e*x))/x^3
```

3.17 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^5}\,dx$

3.17.1 Optimal result

Integrand size = 21, antiderivative size = 95

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^5}\,dx = -\frac{bd^2n}{16x^4}-\frac{2bden}{9x^3}-\frac{be^2n}{4x^2}-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{2x^2}$$

output
```
-1/16*b*d^2*n/x^4-2/9*b*d*e*n/x^3-1/4*b*e^2*n/x^2-1/4*d^2*(a+b*ln(c*x^n))/
x^4-2/3*d*e*(a+b*ln(c*x^n))/x^3-1/2*e^2*(a+b*ln(c*x^n))/x^2
```

3.17.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.84

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^5}\,dx = -\frac{12a(3d^2+8dex+6e^2x^2)+bn(9d^2+32dex+36e^2x^2)+12b(3d^2+8dex+6e^2x^2)\log(cx^n)}{144x^4}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
-1/144*(12*a*(3*d^2 + 8*d*e*x + 6*e^2*x^2) + b*n*(9*d^2 + 32*d*e*x + 36*e^
2*x^2) + 12*b*(3*d^2 + 8*d*e*x + 6*e^2*x^2)*Log[c*x^n])/x^4
```

3.17.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 94, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2772, 27, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^5}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{3d^2+8exd+6e^2x^2}{12x^5}dx-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{12}bn\int \frac{3d^2+8exd+6e^2x^2}{x^5}dx-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{1140}$$

$$\frac{1}{12}bn\int \left(\frac{3d^2}{x^5}+\frac{8ed}{x^4}+\frac{6e^2}{x^3}\right)dx-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{2x^2}+\frac{1}{12}bn\left(-\frac{3d^2}{4x^4}-\frac{8de}{3x^3}-\frac{3e^2}{x^2}\right)$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*((-3*d^2)/(4*x^4) - (8*d*e)/(3*x^3) - (3*e^2)/x^2))/12 - (d^2*(a + b*
Log[c*x^n]))/(4*x^4) - (2*d*e*(a + b*Log[c*x^n]))/(3*x^3) - (e^2*(a + b*Lo
g[c*x^n]))/(2*x^2)
```

3.17.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.17.4 Maple [A] (verified)

Time = 0.58 (sec) , antiderivative size = 91, normalized size of antiderivative = 0.96

method	result
parallelrisch	$-\frac{72 b \ln\left(c\,x^{n}\right) e^{2} x^{2}+36 b\,e^{2} n\,x^{2}+72 a\,e^{2} x^{2}+96 b \ln\left(c\,x^{n}\right) d e x+32 b d e n x+96 a d e x+36 b \ln\left(c\,x^{n}\right) d^{2}+9 b\,d^{2} n+36 a\,d^{2}}{144 x^{4}}$
risch	$-\frac{b\left(6 e^{2} x^{2}+8 d e x+3 d^{2}\right) \ln\left(x^{n}\right)}{12 x^{4}}-\frac{18 i \pi b\,d^{2} \operatorname{csgn}\left(i c\right) \operatorname{csgn}\left(i c\,x^{n}\right)^{2}-36 i \pi b\,e^{2} x^{2} \operatorname{csgn}\left(i c\,x^{n}\right)^{3}-48 i \pi b d e x \operatorname{csgn}\left(i c\,x^{n}\right)^{3}+48 i \pi b d e x}{}$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/144/x^4*(72*b*ln(c*x^n)*e^2*x^2+36*b*e^2*n*x^2+72*a*e^2*x^2+96*b*ln(c*x
^n)*d*e*x+32*b*d*e*n*x+96*a*d*e*x+36*b*ln(c*x^n)*d^2+9*b*d^2*n+36*a*d^2)
```

3.17.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.12

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^5}\,dx =$$
$$-\frac{9\,bd^2n + 36\,ad^2 + 36\,(be^2n + 2\,ae^2)x^2 + 32\,(bden + 3\,ade)x + 12\,(6\,be^2x^2 + 8\,bdex + 3\,bd^2)\log(c) + 12}{144\,x^4}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
-1/144*(9*b*d^2*n + 36*a*d^2 + 36*(b*e^2*n + 2*a*e^2)*x^2 + 32*(b*d*e*n +
3*a*d*e)*x + 12*(6*b*e^2*x^2 + 8*b*d*e*x + 3*b*d^2)*log(c) + 12*(6*b*e^2*n
*x^2 + 8*b*d*e*n*x + 3*b*d^2*n)*log(x))/x^4
```

3.17.6 Sympy [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 122, normalized size of antiderivative = 1.28

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^5}\,dx = -\frac{ad^2}{4x^4} - \frac{2ade}{3x^3} - \frac{ae^2}{2x^2} - \frac{bd^2n}{16x^4} - \frac{bd^2\log(cx^n)}{4x^4} - \frac{2bden}{9x^3} - \frac{2bde\log(cx^n)}{3x^3} - \frac{be^2n}{4x^2} - \frac{be^2\log(cx^n)}{2x^2}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**5,x)
```

output
```
-a*d**2/(4*x**4) - 2*a*d*e/(3*x**3) - a*e**2/(2*x**2) - b*d**2*n/(16*x**4)
 - b*d**2*log(c*x**n)/(4*x**4) - 2*b*d*e*n/(9*x**3) - 2*b*d*e*log(c*x**n)/
(3*x**3) - b*e**2*n/(4*x**2) - b*e**2*log(c*x**n)/(2*x**2)
```

3.17.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^5}\,dx = -\frac{be^2n}{4\,x^2} - \frac{be^2\log(cx^n)}{2\,x^2} - \frac{2\,bden}{9\,x^3} - \frac{ae^2}{2\,x^2} - \frac{2\,bde\log(cx^n)}{3\,x^3} - \frac{bd^2n}{16\,x^4} - \frac{2\,ade}{3\,x^3} - \frac{bd^2\log(cx^n)}{4\,x^4} - \frac{ad^2}{4\,x^4}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
-1/4*b*e^2*n/x^2 - 1/2*b*e^2*log(c*x^n)/x^2 - 2/9*b*d*e*n/x^3 - 1/2*a*e^2/
x^2 - 2/3*b*d*e*log(c*x^n)/x^3 - 1/16*b*d^2*n/x^4 - 2/3*a*d*e/x^3 - 1/4*b*
d^2*log(c*x^n)/x^4 - 1/4*a*d^2/x^4
```

3.17.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 111, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^5}\,dx = -\frac{(6\,be^2nx^2+8\,bdenx+3\,bd^2n)\log(x)}{12\,x^4} - \frac{36\,be^2nx^2+72\,be^2x^2\log(c)+32\,bdenx+72\,ae^2x^2+96\,bdex\log(c)+9\,bd^2n+96\,adex+36\,bd^2\log(c)}{144\,x^4}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
-1/12*(6*b*e^2*n*x^2 + 8*b*d*e*n*x + 3*b*d^2*n)*log(x)/x^4 - 1/144*(36*b*e
^2*n*x^2 + 72*b*e^2*x^2*log(c) + 32*b*d*e*n*x + 72*a*e^2*x^2 + 96*b*d*e*x*
log(c) + 9*b*d^2*n + 96*a*d*e*x + 36*b*d^2*log(c) + 36*a*d^2)/x^4
```

3.17.9 Mupad [B] (verification not implemented)

Time = 0.43 (sec) , antiderivative size = 85, normalized size of antiderivative = 0.89

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^5}\,dx = -\frac{x^2\,(6\,a\,e^2+3\,b\,e^2\,n)+3\,a\,d^2+x\,\left(8\,a\,d\,e+\frac{8\,b\,d\,e\,n}{3}\right)+\frac{3\,b\,d^2\,n}{4}}{12\,x^4} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d^2}{4}+\frac{2\,b\,d\,e\,x}{3}+\frac{b\,e^2\,x^2}{2}\right)}{x^4}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^2)/x^5,x)
```

output
```
- (x^2*(6*a*e^2 + 3*b*e^2*n) + 3*a*d^2 + x*(8*a*d*e + (8*b*d*e*n)/3) + (3*
b*d^2*n)/4)/(12*x^4) - (log(c*x^n)*((b*d^2)/4 + (b*e^2*x^2)/2 + (2*b*d*e*x
)/3))/x^4
```

3.18 $\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^6} dx$

3.18.1 Optimal result

Integrand size = 21, antiderivative size = 95

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^6} dx = -\frac{bd^2n}{25x^5} - \frac{bden}{8x^4} - \frac{be^2n}{9x^3} - \frac{d^2(a+b\log(cx^n))}{5x^5} - \frac{de(a+b\log(cx^n))}{2x^4} - \frac{e^2(a+b\log(cx^n))}{3x^3}$$

output
```
-1/25*b*d^2*n/x^5-1/8*b*d*e*n/x^4-1/9*b*e^2*n/x^3-1/5*d^2*(a+b*ln(c*x^n))/
x^5-1/2*d*e*(a+b*ln(c*x^n))/x^4-1/3*e^2*(a+b*ln(c*x^n))/x^3
```

3.18.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.84

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^6} dx = -\frac{60a(6d^2+15dex+10e^2x^2)+bn(72d^2+225dex+200e^2x^2)+60b(6d^2+15dex+10e^2x^2)\log(cx^n)}{1800x^5}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/1800*(60*a*(6*d^2 + 15*d*e*x + 10*e^2*x^2) + b*n*(72*d^2 + 225*d*e*x +
200*e^2*x^2) + 60*b*(6*d^2 + 15*d*e*x + 10*e^2*x^2)*Log[c*x^n])/x^5
```

3.18.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2772, 27, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))}{x^6} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn \int -\frac{6d^2+15exd+10e^2x^2}{30x^6}dx - \frac{d^2(a+b\log(cx^n))}{5x^5} - \frac{de(a+b\log(cx^n))}{2x^4} - \frac{e^2(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{30}bn \int \frac{6d^2+15exd+10e^2x^2}{x^6}dx - \frac{d^2(a+b\log(cx^n))}{5x^5} - \frac{de(a+b\log(cx^n))}{2x^4} - \frac{e^2(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{1140}$$

$$\frac{1}{30}bn \int \left(\frac{6d^2}{x^6} + \frac{15ed}{x^5} + \frac{10e^2}{x^4}\right) dx - \frac{d^2(a+b\log(cx^n))}{5x^5} - \frac{de(a+b\log(cx^n))}{2x^4} - \frac{e^2(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{5x^5} - \frac{de(a+b\log(cx^n))}{2x^4} - \frac{e^2(a+b\log(cx^n))}{3x^3} + \frac{1}{30}bn\left(-\frac{6d^2}{5x^5} - \frac{15de}{4x^4} - \frac{10e^2}{3x^3}\right)$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*((-6*d^2)/(5*x^5) - (15*d*e)/(4*x^4) - (10*e^2)/(3*x^3)))/30 - (d^2*(
a + b*Log[c*x^n]))/(5*x^5) - (d*e*(a + b*Log[c*x^n]))/(2*x^4) - (e^2*(a +
b*Log[c*x^n]))/(3*x^3)
```

3.18.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.18.4 Maple [A] (verified)

Time = 0.57 (sec) , antiderivative size = 91, normalized size of antiderivative = 0.96

method	result
parallelrisch	$-\frac{600 b \ln\left(c\,x^{n}\right) e^{2} x^{2}+200 b\,e^{2} n\,x^{2}+600 a\,e^{2} x^{2}+900 b \ln\left(c\,x^{n}\right) d e x+225 b d e n x+900 a d e x+360 b \ln\left(c\,x^{n}\right) d^{2}+72 b\,d^{2} n+360 a\,d^{2}}{1800 x^{5}}$
risch	$-\frac{b\left(10 e^{2} x^{2}+15 d e x+6 d^{2}\right) \ln\left(x^{n}\right)}{30 x^{5}}-\frac{-180 i \pi b\,d^{2} \operatorname{csgn}\left(i c\,x^{n}\right)^{3}-450 i \pi b d e x \operatorname{csgn}\left(i c\right) \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c\,x^{n}\right)+180 i \pi b\,d^{2} \operatorname{csgn}\left(i c\right)}{}$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/1800/x^5*(600*b*ln(c*x^n)*e^2*x^2+200*b*e^2*n*x^2+600*a*e^2*x^2+900*b*l
n(c*x^n)*d*e*x+225*b*d*e*n*x+900*a*d*e*x+360*b*ln(c*x^n)*d^2+72*b*d^2*n+36
0*a*d^2)
```

3.18.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.12

$$\int \frac{(d+ex)^2\,(a+b\log{(cx^n)})}{x^6}\,dx = -\frac{72\,bd^2n + 360\,ad^2 + 200\,(be^2n + 3\,ae^2)x^2 + 225\,(bden + 4\,ade)x + 60\,(10\,be^2x^2 + 15\,bdex + 6\,bd^2)\log{(c)}}{1800\,x^5}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/1800*(72*b*d^2*n + 360*a*d^2 + 200*(b*e^2*n + 3*a*e^2)*x^2 + 225*(b*d*e
*n + 4*a*d*e)*x + 60*(10*b*e^2*x^2 + 15*b*d*e*x + 6*b*d^2)*log(c) + 60*(10
*b*e^2*n*x^2 + 15*b*d*e*n*x + 6*b*d^2*n)*log(x))/x^5
```

3.18.6 Sympy [A] (verification not implemented)

Time = 0.54 (sec) , antiderivative size = 117, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex)^2\,(a+b\log{(cx^n)})}{x^6}\,dx = -\frac{ad^2}{5x^5} - \frac{ade}{2x^4} - \frac{ae^2}{3x^3} - \frac{bd^2n}{25x^5} - \frac{bd^2\log{(cx^n)}}{5x^5} - \frac{bden}{8x^4} - \frac{bde\log{(cx^n)}}{2x^4} - \frac{be^2n}{9x^3} - \frac{be^2\log{(cx^n)}}{3x^3}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))/x**6,x)
```

output
```
-a*d**2/(5*x**5) - a*d*e/(2*x**4) - a*e**2/(3*x**3) - b*d**2*n/(25*x**5) -
 b*d**2*log(c*x**n)/(5*x**5) - b*d*e*n/(8*x**4) - b*d*e*log(c*x**n)/(2*x**
4) - b*e**2*n/(9*x**3) - b*e**2*log(c*x**n)/(3*x**3)
```

3.18.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex)^2\,(a+b\log{(cx^n)})}{x^6}\,dx = -\frac{be^2n}{9\,x^3} - \frac{be^2\log{(cx^n)}}{3\,x^3} - \frac{bden}{8\,x^4} - \frac{ae^2}{3\,x^3} - \frac{bde\log{(cx^n)}}{2\,x^4} - \frac{bd^2n}{25\,x^5} - \frac{ade}{2\,x^4} - \frac{bd^2\log{(cx^n)}}{5\,x^5} - \frac{ad^2}{5\,x^5}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
-1/9*b*e^2*n/x^3 - 1/3*b*e^2*log(c*x^n)/x^3 - 1/8*b*d*e*n/x^4 - 1/3*a*e^2/
x^3 - 1/2*b*d*e*log(c*x^n)/x^4 - 1/25*b*d^2*n/x^5 - 1/2*a*d*e/x^4 - 1/5*b*
d^2*log(c*x^n)/x^5 - 1/5*a*d^2/x^5
```

3.18.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 111, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^6}\,dx = -\frac{(10\,be^2nx^2+15\,bdenx+6\,bd^2n)\log(x)}{30\,x^5} - \frac{200\,be^2nx^2+600\,be^2x^2\log(c)+225\,bdenx+600\,ae^2x^2+900\,bdex\log(c)+72\,bd^2n+900\,adex+360\,b}{1800\,x^5}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
-1/30*(10*b*e^2*n*x^2 + 15*b*d*e*n*x + 6*b*d^2*n)*log(x)/x^5 - 1/1800*(200
*b*e^2*n*x^2 + 600*b*e^2*x^2*log(c) + 225*b*d*e*n*x + 600*a*e^2*x^2 + 900*
b*d*e*x*log(c) + 72*b*d^2*n + 900*a*d*e*x + 360*b*d^2*log(c) + 360*a*d^2)/
x^5
```

3.18.9 Mupad [B] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 85, normalized size of antiderivative = 0.89

$$\int \frac{(d+ex)^2(a+b\log(cx^n))}{x^6}\,dx = -\frac{x^2\left(10\,a\,e^2+\frac{10\,b\,e^2\,n}{3}\right)+6\,a\,d^2+x\left(15\,a\,d\,e+\frac{15\,b\,d\,e\,n}{4}\right)+\frac{6\,b\,d^2\,n}{5}}{30\,x^5} - \frac{\ln(c\,x^n)\left(\frac{b\,d^2}{5}+\frac{b\,d\,e\,x}{2}+\frac{b\,e^2\,x^2}{3}\right)}{x^5}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^2)/x^6,x)
```

output
```
- (x^2*(10*a*e^2 + (10*b*e^2*n)/3) + 6*a*d^2 + x*(15*a*d*e + (15*b*d*e*n)/
4) + (6*b*d^2*n)/5)/(30*x^5) - (log(c*x^n)*((b*d^2)/5 + (b*e^2*x^2)/3 + (b
*d*e*x)/2))/x^5
```

3.19 $\int x^3(d+ex)^3 (a+b\log (cx^n)) \, dx$

3.19.1 Optimal result

Integrand size = 21, antiderivative size = 100

$$\int x^3(d+ex)^3 (a+b\log (cx^n)) \, dx = -\frac{1}{16}bd^3nx^4-\frac{3}{25}bd^2enx^5-\frac{1}{12}bde^2nx^6-\frac{1}{49}be^3nx^7 + \frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right) (a + b\log (cx^n))$$

output
```
-1/16*b*d^3*n*x^4-3/25*b*d^2*e*n*x^5-1/12*b*d*e^2*n*x^6-1/49*b*e^3*n*x^7+1
/140*(20*e^3*x^7+70*d*e^2*x^6+84*d^2*e*x^5+35*d^3*x^4)*(a+b*ln(c*x^n))
```

3.19.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.33

$$\int x^3(d+ex)^3 (a+b\log (cx^n)) \, dx = -\frac{1}{16}bd^3nx^4-\frac{3}{25}bd^2enx^5-\frac{1}{12}bde^2nx^6-\frac{1}{49}be^3nx^7 + \frac{1}{4}d^3x^4(a+b\log (cx^n))+\frac{3}{5}d^2ex^5(a+b\log (cx^n)) + \frac{1}{2}de^2x^6(a+b\log (cx^n))+\frac{1}{7}e^3x^7(a+b\log (cx^n))$$

input
```
Integrate[x^3*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/16*(b*d^3*n*x^4) - (3*b*d^2*e*n*x^5)/25 - (b*d*e^2*n*x^6)/12 - (b*e^3*n
*x^7)/49 + (d^3*x^4*(a + b*Log[c*x^n]))/4 + (3*d^2*e*x^5*(a + b*Log[c*x^n]
))/5 + (d*e^2*x^6*(a + b*Log[c*x^n]))/2 + (e^3*x^7*(a + b*Log[c*x^n]))/7
```

3.19.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 99, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex)^3 (a+b\log (cx^n)) \, dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right)(a+b\log (cx^n))-bn\int \frac{1}{140}x^3\left(35d^3+84exd^2+70e^2x^2d+20e^3x^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right)(a+b\log (cx^n))-\frac{1}{140}bn\int x^3\left(35d^3+84exd^2+70e^2x^2d+20e^3x^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right)(a+b\log (cx^n))-\frac{1}{140}bn\int \left(20e^3x^6+70de^2x^5+84d^2ex^4+35d^3x^3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{140}\left(35d^3x^4+84d^2ex^5+70de^2x^6+20e^3x^7\right)(a+b\log (cx^n))-\frac{1}{140}bn\left(\frac{35d^3x^4}{4}+\frac{84}{5}d^2ex^5+\frac{35}{3}de^2x^6+\frac{20e^3x^7}{7}\right)$$

input
```
Int[x^3*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/140*(b*n*((35*d^3*x^4)/4 + (84*d^2*e*x^5)/5 + (35*d*e^2*x^6)/3 + (20*e^
3*x^7)/7)) + ((35*d^3*x^4 + 84*d^2*e*x^5 + 70*d*e^2*x^6 + 20*e^3*x^7)*(a +
 b*Log[c*x^n]))/140
```

3.19.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.19.4 Maple [A] (verified)

Time = 11.00 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.44

method	result
parallelrisch	$\frac{x^{7} \ln \left(c \,x^{n}\right) b \,e^{3}}{7}-\frac{b \,e^{3} n \,x^{7}}{49}+\frac{a \,e^{3} x^{7}}{7}+\frac{x^{6} \ln \left(c \,x^{n}\right) b d \,e^{2}}{2}-\frac{b d \,e^{2} n \,x^{6}}{12}+\frac{a d \,e^{2} x^{6}}{2}+\frac{3 x^{5} \ln \left(c \,x^{n}\right) b \,d^{2} e}{5}-\frac{3 b \,d^{2} e n \,x^{5}}{25}+$
risch	$\frac{a \,e^{3} x^{7}}{7}+\frac{a \,d^{3} x^{4}}{4}+\frac{3 a \,d^{2} e \,x^{5}}{5}+\frac{a d \,e^{2} x^{6}}{2}+\frac{i \pi b \,e^{3} x^{7} \operatorname{csgn}\left(i c \right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}}{14}+\frac{i \pi b \,e^{3} x^{7} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}}{14}-$

input
```
int(x^3*(e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/7*x^7*ln(c*x^n)*b*e^3-1/49*b*e^3*n*x^7+1/7*a*e^3*x^7+1/2*x^6*ln(c*x^n)*b
*d*e^2-1/12*b*d*e^2*n*x^6+1/2*a*d*e^2*x^6+3/5*x^5*ln(c*x^n)*b*d^2*e-3/25*b
*d^2*e*n*x^5+3/5*a*d^2*e*x^5+1/4*x^4*ln(c*x^n)*b*d^3-1/16*b*d^3*n*x^4+1/4*
a*d^3*x^4
```

3.19.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.67

$$\int x^3(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= -\frac{1}{49}\left(be^3n-7\,ae^3\right)x^7-\frac{1}{12}\left(bde^2n-6\,ade^2\right)x^6-\frac{3}{25}\left(bd^2en-5\,ad^2e\right)x^5$$
$$-\frac{1}{16}\left(bd^3n-4\,ad^3\right)x^4+\frac{1}{140}\left(20\,be^3x^7+70\,bde^2x^6+84\,bd^2ex^5+35\,bd^3x^4\right)\log\left(c\right)$$
$$+\frac{1}{140}\left(20\,be^3nx^7+70\,bde^2nx^6+84\,bd^2enx^5+35\,bd^3nx^4\right)\log\left(x\right)$$

input
```
integrate(x^3*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/49*(b*e^3*n - 7*a*e^3)*x^7 - 1/12*(b*d*e^2*n - 6*a*d*e^2)*x^6 - 3/25*(b
*d^2*e*n - 5*a*d^2*e)*x^5 - 1/16*(b*d^3*n - 4*a*d^3)*x^4 + 1/140*(20*b*e^3
*x^7 + 70*b*d*e^2*x^6 + 84*b*d^2*e*x^5 + 35*b*d^3*x^4)*log(c) + 1/140*(20*
b*e^3*n*x^7 + 70*b*d*e^2*n*x^6 + 84*b*d^2*e*n*x^5 + 35*b*d^3*n*x^4)*log(x)
```

3.19.6 Sympy [A] (verification not implemented)

Time = 0.66 (sec) , antiderivative size = 170, normalized size of antiderivative = 1.70

$$\int x^3(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{ad^3x^4}{4}+\frac{3ad^2ex^5}{5}+\frac{ade^2x^6}{2}+\frac{ae^3x^7}{7}$$
$$-\frac{bd^3nx^4}{16}+\frac{bd^3x^4\log\left(cx^n\right)}{4}-\frac{3bd^2enx^5}{25}$$
$$+\frac{3bd^2ex^5\log\left(cx^n\right)}{5}-\frac{bde^2nx^6}{12}$$
$$+\frac{bde^2x^6\log\left(cx^n\right)}{2}-\frac{be^3nx^7}{49}+\frac{be^3x^7\log\left(cx^n\right)}{7}$$

input
```
integrate(x**3*(e*x+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**4/4 + 3*a*d**2*e*x**5/5 + a*d*e**2*x**6/2 + a*e**3*x**7/7 - b*d*
*3*n*x**4/16 + b*d**3*x**4*log(c*x**n)/4 - 3*b*d**2*e*n*x**5/25 + 3*b*d**2
*e*x**5*log(c*x**n)/5 - b*d*e**2*n*x**6/12 + b*d*e**2*x**6*log(c*x**n)/2 -
 b*e**3*n*x**7/49 + b*e**3*x**7*log(c*x**n)/7
```

3.19.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.43

$$\int x^3(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{49}\,be^3nx^7+\frac{1}{7}\,be^3x^7\log\left(cx^n\right)-\frac{1}{12}\,bde^2nx^6+\frac{1}{7}\,ae^3x^7+\frac{1}{2}\,bde^2x^6\log\left(cx^n\right)-\frac{3}{25}\,bd^2enx^5+\frac{1}{2}\,ade^2x^6+\frac{3}{5}\,bd^2ex^5\log\left(cx^n\right)-\frac{1}{16}\,bd^3nx^4+\frac{3}{5}\,ad^2ex^5+\frac{1}{4}\,bd^3x^4\log\left(cx^n\right)+\frac{1}{4}\,ad^3x^4$$

input

```
integrate(x^3*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output

```
-1/49*b*e^3*n*x^7 + 1/7*b*e^3*x^7*log(c*x^n) - 1/12*b*d*e^2*n*x^6 + 1/7*a*
e^3*x^7 + 1/2*b*d*e^2*x^6*log(c*x^n) - 3/25*b*d^2*e*n*x^5 + 1/2*a*d*e^2*x^
6 + 3/5*b*d^2*e*x^5*log(c*x^n) - 1/16*b*d^3*n*x^4 + 3/5*a*d^2*e*x^5 + 1/4*
b*d^3*x^4*log(c*x^n) + 1/4*a*d^3*x^4
```

3.19.8 Giac [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.77

$$\int x^3(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{1}{7}\,be^3nx^7\log\left(x\right)-\frac{1}{49}\,be^3nx^7+\frac{1}{7}\,be^3x^7\log\left(c\right)+\frac{1}{2}\,bde^2nx^6\log\left(x\right)-\frac{1}{12}\,bde^2nx^6+\frac{1}{7}\,ae^3x^7+\frac{1}{2}\,bde^2x^6\log\left(c\right)+\frac{3}{5}\,bd^2enx^5\log\left(x\right)-\frac{3}{25}\,bd^2enx^5+\frac{1}{2}\,ade^2x^6+\frac{3}{5}\,bd^2ex^5\log\left(c\right)+\frac{1}{4}\,bd^3nx^4\log\left(x\right)-\frac{1}{16}\,bd^3nx^4+\frac{3}{5}\,ad^2ex^5+\frac{1}{4}\,bd^3x^4\log\left(c\right)+\frac{1}{4}\,ad^3x^4$$

input

```
integrate(x^3*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output

```
1/7*b*e^3*n*x^7*log(x) - 1/49*b*e^3*n*x^7 + 1/7*b*e^3*x^7*log(c) + 1/2*b*d
*e^2*n*x^6*log(x) - 1/12*b*d*e^2*n*x^6 + 1/7*a*e^3*x^7 + 1/2*b*d*e^2*x^6*l
og(c) + 3/5*b*d^2*e*n*x^5*log(x) - 3/25*b*d^2*e*n*x^5 + 1/2*a*d*e^2*x^6 +
3/5*b*d^2*e*x^5*log(c) + 1/4*b*d^3*n*x^4*log(x) - 1/16*b*d^3*n*x^4 + 3/5*a
*d^2*e*x^5 + 1/4*b*d^3*x^4*log(c) + 1/4*a*d^3*x^4
```

3.19.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.13

$$\int x^3(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = \ln\left(c\,x^n\right)\,\left(\frac{b\,d^3\,x^4}{4}+\frac{3\,b\,d^2\,e\,x^5}{5}+\frac{b\,d\,e^2\,x^6}{2}+\frac{b\,e^3\,x^7}{7}\right) + \frac{d^3\,x^4\,\left(4\,a-b\,n\right)}{16}+\frac{e^3\,x^7\,\left(7\,a-b\,n\right)}{49} + \frac{3\,d^2\,e\,x^5\,\left(5\,a-b\,n\right)}{25}+\frac{d\,e^2\,x^6\,\left(6\,a-b\,n\right)}{12}$$

input
```
int(x^3*(a + b*log(c*x^n))*(d + e*x)^3,x)
```

output
```
log(c*x^n)*((b*d^3*x^4)/4 + (b*e^3*x^7)/7 + (3*b*d^2*e*x^5)/5 + (b*d*e^2*x
^6)/2) + (d^3*x^4*(4*a - b*n))/16 + (e^3*x^7*(7*a - b*n))/49 + (3*d^2*e*x^
5*(5*a - b*n))/25 + (d*e^2*x^6*(6*a - b*n))/12
```

3.20 $\int x^2(d+ex)^3 (a+b\log (cx^n)) \, dx$

3.20.1 Optimal result

Integrand size = 21, antiderivative size = 100

$$\int x^2(d+ex)^3 (a+b\log (cx^n)) \, dx = -\frac{1}{9}bd^3nx^3-\frac{3}{16}bd^2enx^4-\frac{3}{25}bde^2nx^5-\frac{1}{36}be^3nx^6 +\frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right) (a +b\log (cx^n))$$

output
```
-1/9*b*d^3*n*x^3-3/16*b*d^2*e*n*x^4-3/25*b*d*e^2*n*x^5-1/36*b*e^3*n*x^6+1/
60*(10*e^3*x^6+36*d*e^2*x^5+45*d^2*e*x^4+20*d^3*x^3)*(a+b*ln(c*x^n))
```

3.20.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.33

$$\int x^2(d+ex)^3 (a+b\log (cx^n)) \, dx = -\frac{1}{9}bd^3nx^3-\frac{3}{16}bd^2enx^4-\frac{3}{25}bde^2nx^5-\frac{1}{36}be^3nx^6 +\frac{1}{3}d^3x^3(a+b\log (cx^n))+\frac{3}{4}d^2ex^4(a+b\log (cx^n)) +\frac{3}{5}de^2x^5(a+b\log (cx^n))+\frac{1}{6}e^3x^6(a+b\log (cx^n))$$

input
```
Integrate[x^2*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/9*(b*d^3*n*x^3) - (3*b*d^2*e*n*x^4)/16 - (3*b*d*e^2*n*x^5)/25 - (b*e^3*
n*x^6)/36 + (d^3*x^3*(a + b*Log[c*x^n]))/3 + (3*d^2*e*x^4*(a + b*Log[c*x^n
]))/4 + (3*d*e^2*x^5*(a + b*Log[c*x^n]))/5 + (e^3*x^6*(a + b*Log[c*x^n]))/
6
```

3.20.3 Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 99, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex)^3(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)(a+b\log(cx^n))-bn\int \frac{1}{60}x^2\left(20d^3+45exd^2+36e^2x^2d+10e^3x^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)(a+b\log(cx^n))-\frac{1}{60}bn\int x^2\left(20d^3+45exd^2+36e^2x^2d+10e^3x^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)(a+b\log(cx^n))-\frac{1}{60}bn\int \left(10e^3x^5+36de^2x^4+45d^2ex^3+20d^3x^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{60}\left(20d^3x^3+45d^2ex^4+36de^2x^5+10e^3x^6\right)(a+b\log(cx^n))-\frac{1}{60}bn\left(\frac{20d^3x^3}{3}+\frac{45}{4}d^2ex^4+\frac{36}{5}de^2x^5+\frac{5e^3x^6}{3}\right)$$

input
```
Int[x^2*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/60*(b*n*((20*d^3*x^3)/3 + (45*d^2*e*x^4)/4 + (36*d*e^2*x^5)/5 + (5*e^3*
x^6)/3)) + ((20*d^3*x^3 + 45*d^2*e*x^4 + 36*d*e^2*x^5 + 10*e^3*x^6)*(a + b
*Log[c*x^n]))/60
```

3.20.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.20.4 Maple [A] (verified)

Time = 5.90 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.44

method	result
parallelrisch	$\frac{x^{6} b \ln\left(c \,x^{n}\right) e^{3}}{6}-\frac{b \,e^{3} n \,x^{6}}{36}+\frac{x^{6} a \,e^{3}}{6}+\frac{3 x^{5} b \ln\left(c \,x^{n}\right) d \,e^{2}}{5}-\frac{3 b d \,e^{2} n \,x^{5}}{25}+\frac{3 x^{5} a d \,e^{2}}{5}+\frac{3 x^{4} b \ln\left(c \,x^{n}\right) d^{2} e}{4}-\frac{3 b \,d^{2} e n \,x^{4}}{16}$
risch	$\frac{a \,d^{3} x^{3}}{3}+\frac{x^{6} a \,e^{3}}{6}-\frac{i \pi b \,d^{3} x^{3} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{6}-\frac{i \pi b \,e^{3} x^{6} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{12}+\frac{3 x^{5} a d \,e^{2}}{5}+\frac{3 x^{4} a \,d^{2} e}{4}-\frac{3 i \pi b d \,e^{2} x^{5} \operatorname{csgn}\left(i c\right) \operatorname{csgn}}{10}$

input
```
int(x^2*(e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/6*x^6*b*ln(c*x^n)*e^3-1/36*b*e^3*n*x^6+1/6*x^6*a*e^3+3/5*x^5*b*ln(c*x^n)
*d*e^2-3/25*b*d*e^2*n*x^5+3/5*x^5*a*d*e^2+3/4*x^4*b*ln(c*x^n)*d^2*e-3/16*b
*d^2*e*n*x^4+3/4*x^4*a*d^2*e+1/3*x^3*b*ln(c*x^n)*d^3-1/9*b*d^3*n*x^3+1/3*a
*d^3*x^3
```

3.20.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.67

$$\int x^2(d+ex)^3(a+b\log(cx^n))\,dx$$
$$=-\frac{1}{36}\left(be^3n-6\,ae^3\right)x^6-\frac{3}{25}\left(bde^2n-5\,ade^2\right)x^5-\frac{3}{16}\left(bd^2en-4\,ad^2e\right)x^4$$
$$-\frac{1}{9}\left(bd^3n-3\,ad^3\right)x^3+\frac{1}{60}\left(10\,be^3x^6+36\,bde^2x^5+45\,bd^2ex^4+20\,bd^3x^3\right)\log(c)$$
$$+\frac{1}{60}\left(10\,be^3nx^6+36\,bde^2nx^5+45\,bd^2enx^4+20\,bd^3nx^3\right)\log(x)$$

input
```
integrate(x^2*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/36*(b*e^3*n - 6*a*e^3)*x^6 - 3/25*(b*d*e^2*n - 5*a*d*e^2)*x^5 - 3/16*(b
*d^2*e*n - 4*a*d^2*e)*x^4 - 1/9*(b*d^3*n - 3*a*d^3)*x^3 + 1/60*(10*b*e^3*x
^6 + 36*b*d*e^2*x^5 + 45*b*d^2*e*x^4 + 20*b*d^3*x^3)*log(c) + 1/60*(10*b*e
^3*n*x^6 + 36*b*d*e^2*n*x^5 + 45*b*d^2*e*n*x^4 + 20*b*d^3*n*x^3)*log(x)
```

3.20.6 Sympy [A] (verification not implemented)

Time = 0.50 (sec) , antiderivative size = 175, normalized size of antiderivative = 1.75

$$\int x^2(d+ex)^3(a+b\log(cx^n))\,dx=\frac{ad^3x^3}{3}+\frac{3ad^2ex^4}{4}+\frac{3ade^2x^5}{5}+\frac{ae^3x^6}{6}-\frac{bd^3nx^3}{9}+\frac{bd^3x^3\log(cx^n)}{3}-\frac{3bd^2enx^4}{16}+\frac{3bd^2ex^4\log(cx^n)}{4}-\frac{3bde^2nx^5}{25}+\frac{3bde^2x^5\log(cx^n)}{5}-\frac{be^3nx^6}{36}+\frac{be^3x^6\log(cx^n)}{6}$$

input
```
integrate(x**2*(e*x+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**3/3 + 3*a*d**2*e*x**4/4 + 3*a*d*e**2*x**5/5 + a*e**3*x**6/6 - b*
d**3*n*x**3/9 + b*d**3*x**3*log(c*x**n)/3 - 3*b*d**2*e*n*x**4/16 + 3*b*d**
2*e*x**4*log(c*x**n)/4 - 3*b*d*e**2*n*x**5/25 + 3*b*d*e**2*x**5*log(c*x**n
)/5 - b*e**3*n*x**6/36 + b*e**3*x**6*log(c*x**n)/6
```

3.20.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.43

$$\int x^2(d+ex)^3(a+b\log(cx^n))\,dx = -\frac{1}{36}be^3nx^6+\frac{1}{6}be^3x^6\log(cx^n)-\frac{3}{25}bde^2nx^5+\frac{1}{6}ae^3x^6+\frac{3}{5}bde^2x^5\log(cx^n)-\frac{3}{16}bd^2enx^4+\frac{3}{5}ade^2x^5+\frac{3}{4}bd^2ex^4\log(cx^n)-\frac{1}{9}bd^3nx^3+\frac{3}{4}ad^2ex^4+\frac{1}{3}bd^3x^3\log(cx^n)+\frac{1}{3}ad^3x^3$$

input
```
integrate(x^2*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*e^3*n*x^6 + 1/6*b*e^3*x^6*log(c*x^n) - 3/25*b*d*e^2*n*x^5 + 1/6*a*
e^3*x^6 + 3/5*b*d*e^2*x^5*log(c*x^n) - 3/16*b*d^2*e*n*x^4 + 3/5*a*d*e^2*x^
5 + 3/4*b*d^2*e*x^4*log(c*x^n) - 1/9*b*d^3*n*x^3 + 3/4*a*d^2*e*x^4 + 1/3*b
*d^3*x^3*log(c*x^n) + 1/3*a*d^3*x^3
```

3.20.8 Giac [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.77

$$\int x^2(d+ex)^3(a+b\log(cx^n))\,dx = \frac{1}{6}be^3nx^6\log(x)-\frac{1}{36}be^3nx^6+\frac{1}{6}be^3x^6\log(c)+\frac{3}{5}bde^2nx^5\log(x)-\frac{3}{25}bde^2nx^5+\frac{1}{6}ae^3x^6+\frac{3}{5}bde^2x^5\log(c)+\frac{3}{4}bd^2enx^4\log(x)-\frac{3}{16}bd^2enx^4+\frac{3}{5}ade^2x^5+\frac{3}{4}bd^2ex^4\log(c)+\frac{1}{3}bd^3nx^3\log(x)-\frac{1}{9}bd^3nx^3+\frac{3}{4}ad^2ex^4+\frac{1}{3}bd^3x^3\log(c)+\frac{1}{3}ad^3x^3$$

input
```
integrate(x^2*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/6*b*e^3*n*x^6*log(x) - 1/36*b*e^3*n*x^6 + 1/6*b*e^3*x^6*log(c) + 3/5*b*d
*e^2*n*x^5*log(x) - 3/25*b*d*e^2*n*x^5 + 1/6*a*e^3*x^6 + 3/5*b*d*e^2*x^5*l
og(c) + 3/4*b*d^2*e*n*x^4*log(x) - 3/16*b*d^2*e*n*x^4 + 3/5*a*d*e^2*x^5 +
3/4*b*d^2*e*x^4*log(c) + 1/3*b*d^3*n*x^3*log(x) - 1/9*b*d^3*n*x^3 + 3/4*a*
d^2*e*x^4 + 1/3*b*d^3*x^3*log(c) + 1/3*a*d^3*x^3
```

3.20.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.13

$$\int x^2(d+ex)^3 (a+b\log(cx^n)) \, dx = \ln(c\,x^n) \left(\frac{b\,d^3\,x^3}{3} + \frac{3\,b\,d^2\,e\,x^4}{4} + \frac{3\,b\,d\,e^2\,x^5}{5} + \frac{b\,e^3\,x^6}{6}\right) + \frac{d^3\,x^3\,(3\,a-b\,n)}{9} + \frac{e^3\,x^6\,(6\,a-b\,n)}{36} + \frac{3\,d^2\,e\,x^4\,(4\,a-b\,n)}{16} + \frac{3\,d\,e^2\,x^5\,(5\,a-b\,n)}{25}$$

input
```
int(x^2*(a + b*log(c*x^n))*(d + e*x)^3,x)
```

output
```
log(c*x^n)*((b*d^3*x^3)/3 + (b*e^3*x^6)/6 + (3*b*d^2*e*x^4)/4 + (3*b*d*e^2
*x^5)/5) + (d^3*x^3*(3*a - b*n))/9 + (e^3*x^6*(6*a - b*n))/36 + (3*d^2*e*x
^4*(4*a - b*n))/16 + (3*d*e^2*x^5*(5*a - b*n))/25
```

3.21 $\int x(d+ex)^3 (a+b\log(cx^n))\,dx$

3.21.1 Optimal result

Integrand size = 19, antiderivative size = 122

$$\int x(d+ex)^3 (a+b\log(cx^n))\,dx = \frac{bd^4nx}{5e} + \frac{3}{20}bd^3nx^2 + \frac{1}{15}bd^2enx^3 + \frac{1}{80}bde^2nx^4 - \frac{bn(d+ex)^5}{25e^2} + \frac{bd^5n\log(x)}{20e^2} - \frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2} - \frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))$$

output
```
1/5*b*d^4*n*x/e+3/20*b*d^3*n*x^2+1/15*b*d^2*e*n*x^3+1/80*b*d*e^2*n*x^4-1/2
5*b*n*(e*x+d)^5/e^2+1/20*b*d^5*n*ln(x)/e^2-1/20*(5*d*(e*x+d)^4/e^2-4*(e*x+
d)^5/e^2)*(a+b*ln(c*x^n))
```

3.21.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.07

$$\int x(d+ex)^3 (a+b\log(cx^n))\,dx = -\frac{1}{4}bd^3nx^2 - \frac{1}{3}bd^2enx^3 - \frac{3}{16}bde^2nx^4 - \frac{1}{25}be^3nx^5 + \frac{1}{2}d^3x^2(a+b\log(cx^n)) + d^2ex^3(a+b\log(cx^n)) + \frac{3}{4}de^2x^4(a+b\log(cx^n)) + \frac{1}{5}e^3x^5(a+b\log(cx^n))$$

input
```
Integrate[x*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/4*(b*d^3*n*x^2) - (b*d^2*e*n*x^3)/3 - (3*b*d*e^2*n*x^4)/16 - (b*e^3*n*x
^5)/25 + (d^3*x^2*(a + b*Log[c*x^n]))/2 + d^2*e*x^3*(a + b*Log[c*x^n]) + (
3*d*e^2*x^4*(a + b*Log[c*x^n]))/4 + (e^3*x^5*(a + b*Log[c*x^n]))/5
```

3.21.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 110, normalized size of antiderivative = 0.90, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.263$, Rules used = {2771, 27, 90, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$-bn\int -\frac{(d-4ex)(d+ex)^4}{20e^2x}dx-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int\frac{(d-4ex)(d+ex)^4}{x}dx}{20e^2}-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))$$

$$\Big\downarrow \text{90}$$

$$\frac{bn\left(d\int\frac{(d+ex)^4}{x}dx-\frac{4}{5}(d+ex)^5\right)}{20e^2}-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))$$

$$\Big\downarrow \text{49}$$

$$\frac{bn\left(d\int\left(\frac{d^4}{x}+4ed^3+6e^2xd^2+4e^3x^2d+e^4x^3\right)dx-\frac{4}{5}(d+ex)^5\right)}{20e^2}-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(d\left(d^4\log(x)+4d^3ex+3d^2e^2x^2+\frac{4}{3}de^3x^3+\frac{e^4x^4}{4}\right)-\frac{4}{5}(d+ex)^5\right)}{20e^2}-\frac{1}{20}\left(\frac{5d(d+ex)^4}{e^2}-\frac{4(d+ex)^5}{e^2}\right)(a+b\log(cx^n))$$

input
```
Int[x*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
(b*n*((-4*(d + e*x)^5)/5 + d*(4*d^3*e*x + 3*d^2*e^2*x^2 + (4*d*e^3*x^3)/3
+ (e^4*x^4)/4 + d^4*Log[x])))/(20*e^2) - (((5*d*(d + e*x)^4)/e^2 - (4*(d +
 e*x)^5)/e^2)*(a + b*Log[c*x^n]))/20
```

3.21.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.21.4 Maple [A] (verified)

Time = 0.67 (sec) , antiderivative size = 142, normalized size of antiderivative = 1.16

method	result
parallelrisch	$\frac{x^5 b\ln(c\,x^n)e^3}{5}-\frac{b\,e^3 n\,x^5}{25}+\frac{x^5 a\,e^3}{5}+\frac{3x^4 b\ln(c\,x^n)d\,e^2}{4}-\frac{3bd\,e^2 n\,x^4}{16}+\frac{3x^4 ad\,e^2}{4}+x^3 b\ln\left(c\,x^n\right)d^2 e-\frac{b\,d^2 en\,x}{3}$
risch	$\frac{x^5 a\,e^3}{5}+\ln\left(c\right)b\,d^2 e\,x^3+\frac{3\ln(c)bd\,e^2 x^4}{4}-\frac{3i\pi bd\,e^2 x^4\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)}{8}-\frac{i\pi b\,d^2 e\,x^3\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)}{2}$

input
```
int(x*(e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/5*x^5*b*ln(c*x^n)*e^3-1/25*b*e^3*n*x^5+1/5*x^5*a*e^3+3/4*x^4*b*ln(c*x^n)
*d*e^2-3/16*b*d*e^2*n*x^4+3/4*x^4*a*d*e^2+x^3*b*ln(c*x^n)*d^2*e-1/3*b*d^2*
e*n*x^3+x^3*a*d^2*e+1/2*x^2*b*ln(c*x^n)*d^3-1/4*b*d^3*n*x^2+1/2*a*d^3*x^2
```

3.21.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.37

$$\begin{aligned}\int x(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx &= -\frac{1}{25}\left(be^3n-5\,ae^3\right)x^5-\frac{3}{16}\left(bde^2n-4\,ade^2\right)x^4-\frac{1}{3}\left(bd^2en-3\,ad^2e\right)x^3\\ &\quad-\frac{1}{4}\left(bd^3n-2\,ad^3\right)x^2+\frac{1}{20}\left(4\,be^3x^5+15\,bde^2x^4+20\,bd^2ex^3+10\,bd^3x^2\right)\log\left(c\right)\\ &\quad+\frac{1}{20}\left(4\,be^3nx^5+15\,bde^2nx^4+20\,bd^2enx^3+10\,bd^3nx^2\right)\log\left(x\right)\end{aligned}$$

input
```
integrate(x*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/25*(b*e^3*n - 5*a*e^3)*x^5 - 3/16*(b*d*e^2*n - 4*a*d*e^2)*x^4 - 1/3*(b*
d^2*e*n - 3*a*d^2*e)*x^3 - 1/4*(b*d^3*n - 2*a*d^3)*x^2 + 1/20*(4*b*e^3*x^5
 + 15*b*d*e^2*x^4 + 20*b*d^2*e*x^3 + 10*b*d^3*x^2)*log(c) + 1/20*(4*b*e^3*
n*x^5 + 15*b*d*e^2*n*x^4 + 20*b*d^2*e*n*x^3 + 10*b*d^3*n*x^2)*log(x)
```

3.21.6 Sympy [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.37

$$\int x(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{ad^3x^2}{2}+ad^2ex^3+\frac{3ade^2x^4}{4}+\frac{ae^3x^5}{5}-\frac{bd^3nx^2}{4}+\frac{bd^3x^2\log\left(cx^n\right)}{2}-\frac{bd^2enx^3}{3}+bd^2ex^3\log\left(cx^n\right)-\frac{3bde^2nx^4}{16}+\frac{3bde^2x^4\log\left(cx^n\right)}{4}-\frac{be^3nx^5}{25}+\frac{be^3x^5\log\left(cx^n\right)}{5}$$

input
```
integrate(x*(e*x+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**2/2 + a*d**2*e*x**3 + 3*a*d*e**2*x**4/4 + a*e**3*x**5/5 - b*d**3
*n*x**2/4 + b*d**3*x**2*log(c*x**n)/2 - b*d**2*e*n*x**3/3 + b*d**2*e*x**3*
log(c*x**n) - 3*b*d*e**2*n*x**4/16 + 3*b*d*e**2*x**4*log(c*x**n)/4 - b*e**
3*n*x**5/25 + b*e**3*x**5*log(c*x**n)/5
```

3.21.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.16

$$\int x(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{25}\,be^3nx^5+\frac{1}{5}\,be^3x^5\log\left(cx^n\right)-\frac{3}{16}\,bde^2nx^4+\frac{1}{5}\,ae^3x^5+\frac{3}{4}\,bde^2x^4\log\left(cx^n\right)-\frac{1}{3}\,bd^2enx^3+\frac{3}{4}\,ade^2x^4+bd^2ex^3\log\left(cx^n\right)-\frac{1}{4}\,bd^3nx^2+ad^2ex^3+\frac{1}{2}\,bd^3x^2\log\left(cx^n\right)+\frac{1}{2}\,ad^3x^2$$

input
```
integrate(x*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*e^3*n*x^5 + 1/5*b*e^3*x^5*log(c*x^n) - 3/16*b*d*e^2*n*x^4 + 1/5*a*
e^3*x^5 + 3/4*b*d*e^2*x^4*log(c*x^n) - 1/3*b*d^2*e*n*x^3 + 3/4*a*d*e^2*x^4
 + b*d^2*e*x^3*log(c*x^n) - 1/4*b*d^3*n*x^2 + a*d^2*e*x^3 + 1/2*b*d^3*x^2*
log(c*x^n) + 1/2*a*d^3*x^2
```

3.21.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 174, normalized size of antiderivative = 1.43

$$\int x(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{1}{5}be^3nx^5\log(x) - \frac{1}{25}be^3nx^5 + \frac{1}{5}be^3x^5\log(c) + \frac{3}{4}bde^2nx^4\log(x) - \frac{3}{16}bde^2nx^4 + \frac{1}{5}ae^3x^5 + \frac{3}{4}bde^2x^4\log(c) + bd^2enx^3\log(x) - \frac{1}{3}bd^2enx^3 + \frac{3}{4}ade^2x^4 + bd^2ex^3\log(c) + \frac{1}{2}bd^3nx^2\log(x) - \frac{1}{4}bd^3nx^2 + ad^2ex^3 + \frac{1}{2}bd^3x^2\log(c) + \frac{1}{2}ad^3x^2$$

input
```
integrate(x*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/5*b*e^3*n*x^5*log(x) - 1/25*b*e^3*n*x^5 + 1/5*b*e^3*x^5*log(c) + 3/4*b*d
*e^2*n*x^4*log(x) - 3/16*b*d*e^2*n*x^4 + 1/5*a*e^3*x^5 + 3/4*b*d*e^2*x^4*l
og(c) + b*d^2*e*n*x^3*log(x) - 1/3*b*d^2*e*n*x^3 + 3/4*a*d*e^2*x^4 + b*d^2
*e*x^3*log(c) + 1/2*b*d^3*n*x^2*log(x) - 1/4*b*d^3*n*x^2 + a*d^2*e*x^3 + 1
/2*b*d^3*x^2*log(c) + 1/2*a*d^3*x^2
```

3.21.9 Mupad [B] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 112, normalized size of antiderivative = 0.92

$$\int x(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = \ln\left(c\,x^n\right)\left(\frac{b\,d^3\,x^2}{2} + b\,d^2\,e\,x^3 + \frac{3\,b\,d\,e^2\,x^4}{4} + \frac{b\,e^3\,x^5}{5}\right) + \frac{d^3\,x^2\,(2\,a-b\,n)}{4} + \frac{e^3\,x^5\,(5\,a-b\,n)}{25} + \frac{d^2\,e\,x^3\,(3\,a-b\,n)}{3} + \frac{3\,d\,e^2\,x^4\,(4\,a-b\,n)}{16}$$

input
```
int(x*(a + b*log(c*x^n))*(d + e*x)^3,x)
```

output
```
log(c*x^n)*((b*d^3*x^2)/2 + (b*e^3*x^5)/5 + b*d^2*e*x^3 + (3*b*d*e^2*x^4)/
4) + (d^3*x^2*(2*a - b*n))/4 + (e^3*x^5*(5*a - b*n))/25 + (d^2*e*x^3*(3*a
- b*n))/3 + (3*d*e^2*x^4*(4*a - b*n))/16
```

3.22 $\int (d+ex)^3 (a+b\log(cx^n))\,dx$

3.22.1 Optimal result

Integrand size = 18, antiderivative size = 85

$$\int (d+ex)^3 (a+b\log(cx^n))\,dx = -bd^3nx - \frac{3}{4}bd^2enx^2 - \frac{1}{3}bde^2nx^3 - \frac{1}{16}be^3nx^4 - \frac{bd^4n\log(x)}{4e} + \frac{(d+ex)^4 (a+b\log(cx^n))}{4e}$$

output
```
-b*d^3*n*x-3/4*b*d^2*e*n*x^2-1/3*b*d*e^2*n*x^3-1/16*b*e^3*n*x^4-1/4*b*d^4*
n*ln(x)/e+1/4*(e*x+d)^4*(a+b*ln(c*x^n))/e
```

3.22.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.29

$$\int (d+ex)^3 (a+b\log(cx^n))\,dx = \frac{1}{48}x\big(12a(4d^3+6d^2ex+4de^2x^2+e^3x^3) - bn(48d^3+36d^2ex+16de^2x^2+3e^3x^3) + 12b(4d^3+6d^2ex+4de^2x^2+e^3x^3)\log(cx^n)\big)$$

input
```
Integrate[(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x*(12*a*(4*d^3 + 6*d^2*e*x + 4*d*e^2*x^2 + e^3*x^3) - b*n*(48*d^3 + 36*d^
2*e*x + 16*d*e^2*x^2 + 3*e^3*x^3) + 12*b*(4*d^3 + 6*d^2*e*x + 4*d*e^2*x^2
+ e^3*x^3)*Log[c*x^n]))/48
```

3.22.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.94, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222, Rules used = {2750, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \ 2750$$

$$\frac{(d+ex)^4 (a+b\log(cx^n))}{4e}-bn\int \frac{(d+ex)^4}{4ex}dx$$

$$\Big\downarrow \ 27$$

$$\frac{(d+ex)^4 (a+b\log(cx^n))}{4e}-\frac{bn\int \frac{(d+ex)^4}{x}dx}{4e}$$

$$\Big\downarrow \ 49$$

$$\frac{(d+ex)^4 (a+b\log(cx^n))}{4e}-\frac{bn\int \left(\frac{d^4}{x}+4ed^3+6e^2xd^2+4e^3x^2d+e^4x^3\right)dx}{4e}$$

$$\Big\downarrow \ 2009$$

$$\frac{(d+ex)^4 (a+b\log(cx^n))}{4e}-\frac{bn\left(d^4\log(x)+4d^3ex+3d^2e^2x^2+\frac{4}{3}de^3x^3+\frac{e^4x^4}{4}\right)}{4e}$$

input
```
Int[(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/4*(b*n*(4*d^3*e*x + 3*d^2*e^2*x^2 + (4*d*e^3*x^3)/3 + (e^4*x^4)/4 + d^4
*Log[x]))/e + ((d + e*x)^4*(a + b*Log[c*x^n]))/(4*e)
```

3.22.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

3.22.4 Maple [A] (verified)

Time = 0.46 (sec) , antiderivative size = 134, normalized size of antiderivative = 1.58

method	result
parallelrisch	$\frac{b\ln(c\,x^n)e^3x^4}{4}-\frac{b\,e^3n\,x^4}{16}+\frac{a\,e^3x^4}{4}+b\ln\left(c\,x^n\right)d\,e^2x^3-\frac{bd\,e^2n\,x^3}{3}+ad\,e^2x^3+\frac{3b\ln(c\,x^n)d^2e\,x^2}{2}-\frac{3b\,d^2en}{4}$
risch	$\frac{i\pi b\,d^3\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2x}{2}+\frac{ie^3\pi b\,x^4\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2}{8}+\frac{a\,e^3x^4}{4}-\frac{ie^2\pi bd\,x^3\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)}{2}-$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/4*b*ln(c*x^n)*e^3*x^4-1/16*b*e^3*n*x^4+1/4*a*e^3*x^4+b*ln(c*x^n)*d*e^2*x
^3-1/3*b*d*e^2*n*x^3+a*d*e^2*x^3+3/2*b*ln(c*x^n)*d^2*e*x^2-3/4*b*d^2*e*n*x
^2+3/2*a*d^2*e*x^2+x*b*ln(c*x^n)*d^3-b*d^3*n*x+a*d^3*x
```

3.22.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. $2(75) = 150$.

Time = 0.30 (sec) , antiderivative size = 159, normalized size of antiderivative = 1.87

$$\int (d+ex)^3 (a+b\log(cx^n))\,dx = -\frac{1}{16}\left(be^3n - 4\,ae^3\right)x^4 - \frac{1}{3}\left(bde^2n - 3\,ade^2\right)x^3 - \frac{3}{4}\left(bd^2en - 2\,ad^2e\right)x^2 - \left(bd^3n - ad^3\right)x + \frac{1}{4}\left(be^3x^4 + 4\,bde^2x^3 + 6\,bd^2ex^2 + 4\,bd^3x\right)\log(c) + \frac{1}{4}\left(be^3nx^4 + 4\,bde^2nx^3 + 6\,bd^2enx^2 + 4\,bd^3nx\right)\log(x)$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/16*(b*e^3*n - 4*a*e^3)*x^4 - 1/3*(b*d*e^2*n - 3*a*d*e^2)*x^3 - 3/4*(b*d
^2*e*n - 2*a*d^2*e)*x^2 - (b*d^3*n - a*d^3)*x + 1/4*(b*e^3*x^4 + 4*b*d*e^2
*x^3 + 6*b*d^2*e*x^2 + 4*b*d^3*x)*log(c) + 1/4*(b*e^3*n*x^4 + 4*b*d*e^2*n*
x^3 + 6*b*d^2*e*n*x^2 + 4*b*d^3*n*x)*log(x)
```

3.22.6 Sympy [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 156, normalized size of antiderivative = 1.84

$$\int (d+ex)^3 (a+b\log(cx^n))\,dx = ad^3x + \frac{3ad^2ex^2}{2} + ade^2x^3 + \frac{ae^3x^4}{4} - bd^3nx + bd^3x\log(cx^n) - \frac{3bd^2enx^2}{4} + \frac{3bd^2ex^2\log(cx^n)}{2} - \frac{bde^2nx^3}{3} + bde^2x^3\log(cx^n) - \frac{be^3nx^4}{16} + \frac{be^3x^4\log(cx^n)}{4}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x + 3*a*d**2*e*x**2/2 + a*d*e**2*x**3 + a*e**3*x**4/4 - b*d**3*n*x
+ b*d**3*x*log(c*x**n) - 3*b*d**2*e*n*x**2/4 + 3*b*d**2*e*x**2*log(c*x**n)
/2 - b*d*e**2*n*x**3/3 + b*d*e**2*x**3*log(c*x**n) - b*e**3*n*x**4/16 + b*
e**3*x**4*log(c*x**n)/4
```

3.22.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.56

$$\int (d+ex)^3 (a+b\log (cx^n)) \, dx = -\frac{1}{16} be^3nx^4 + \frac{1}{4} be^3x^4 \log (cx^n) - \frac{1}{3} bde^2nx^3 + \frac{1}{4} ae^3x^4 + bde^2x^3 \log (cx^n) - \frac{3}{4} bd^2enx^2 + ade^2x^3 + \frac{3}{2} bd^2ex^2 \log (cx^n) - bd^3nx + \frac{3}{2} ad^2ex^2 + bd^3x \log (cx^n) + ad^3x$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*e^3*n*x^4 + 1/4*b*e^3*x^4*log(c*x^n) - 1/3*b*d*e^2*n*x^3 + 1/4*a*e
^3*x^4 + b*d*e^2*x^3*log(c*x^n) - 3/4*b*d^2*e*n*x^2 + a*d*e^2*x^3 + 3/2*b*
d^2*e*x^2*log(c*x^n) - b*d^3*n*x + 3/2*a*d^2*e*x^2 + b*d^3*x*log(c*x^n) +
a*d^3*x
```

3.22.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 163 vs. 2(75) = 150.

Time = 0.53 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.92

$$\int (d+ex)^3 (a+b\log (cx^n)) \, dx = \frac{1}{4} be^3nx^4 \log (x) - \frac{1}{16} be^3nx^4 + \frac{1}{4} be^3x^4 \log (c) + bde^2nx^3 \log (x) - \frac{1}{3} bde^2nx^3 + \frac{1}{4} ae^3x^4 + bde^2x^3 \log (c) + \frac{3}{2} bd^2enx^2 \log (x) - \frac{3}{4} bd^2enx^2 + ade^2x^3 + \frac{3}{2} bd^2ex^2 \log (c) + bd^3nx \log (x) - bd^3nx + \frac{3}{2} ad^2ex^2 + bd^3x \log (c) + ad^3x$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*b*e^3*n*x^4*log(x) - 1/16*b*e^3*n*x^4 + 1/4*b*e^3*x^4*log(c) + b*d*e^2
*n*x^3*log(x) - 1/3*b*d*e^2*n*x^3 + 1/4*a*e^3*x^4 + b*d*e^2*x^3*log(c) + 3
/2*b*d^2*e*n*x^2*log(x) - 3/4*b*d^2*e*n*x^2 + a*d*e^2*x^3 + 3/2*b*d^2*e*x^
2*log(c) + b*d^3*n*x*log(x) - b*d^3*n*x + 3/2*a*d^2*e*x^2 + b*d^3*x*log(c)
 + a*d^3*x
```

3.22.9 Mupad [B] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.22

$$\int (d+ex)^3 (a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(b\,d^3\,x+\frac{3\,b\,d^2\,e\,x^2}{2}+b\,d\,e^2\,x^3+\frac{b\,e^3\,x^4}{4}\right) + \frac{e^3\,x^4\,(4\,a-b\,n)}{16}+d^3\,x\,(a-b\,n) + \frac{3\,d^2\,e\,x^2\,(2\,a-b\,n)}{4}+\frac{d\,e^2\,x^3\,(3\,a-b\,n)}{3}$$

input
```
int((a + b*log(c*x^n))*(d + e*x)^3,x)
```

output
```
log(c*x^n)*((b*e^3*x^4)/4 + b*d^3*x + (3*b*d^2*e*x^2)/2 + b*d*e^2*x^3) + (
e^3*x^4*(4*a - b*n))/16 + d^3*x*(a - b*n) + (3*d^2*e*x^2*(2*a - b*n))/4 +
(d*e^2*x^3*(3*a - b*n))/3
```

3.23 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x}\,dx$

3.23.1 Optimal result

Integrand size = 21, antiderivative size = 122

$$\int \frac{(d+ex)^3\,(a+b\log\left(cx^n\right))}{x}\,dx = -3bd^2enx-\frac{3}{4}bde^2nx^2-\frac{1}{9}be^3nx^3-\frac{1}{2}bd^3n\log^2(x)+3d^2ex(a+b\log\left(cx^n\right))+\frac{3}{2}de^2x^2(a+b\log\left(cx^n\right))+\frac{1}{3}e^3x^3(a+b\log\left(cx^n\right))+d^3\log(x)\,(a+b\log\left(cx^n\right))$$

output
```
-3*b*d^2*e*n*x-3/4*b*d*e^2*n*x^2-1/9*b*e^3*n*x^3-1/2*b*d^3*n*ln(x)^2+3*d^2
*e*x*(a+b*ln(c*x^n))+3/2*d*e^2*x^2*(a+b*ln(c*x^n))+1/3*e^3*x^3*(a+b*ln(c*x
^n))+d^3*ln(x)*(a+b*ln(c*x^n))
```

3.23.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex)^3\,(a+b\log\left(cx^n\right))}{x}\,dx = 3ad^2ex-3bd^2enx-\frac{3}{4}bde^2nx^2-\frac{1}{9}be^3nx^3+3bd^2ex\log\left(cx^n\right)+\frac{3}{2}de^2x^2(a+b\log\left(cx^n\right))+\frac{1}{3}e^3x^3(a+b\log\left(cx^n\right))+\frac{d^3(a+b\log\left(cx^n\right))^2}{2bn}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
3*a*d^2*e*x - 3*b*d^2*e*n*x - (3*b*d*e^2*n*x^2)/4 - (b*e^3*n*x^3)/9 + 3*b*
d^2*e*x*Log[c*x^n] + (3*d*e^2*x^2*(a + b*Log[c*x^n]))/2 + (e^3*x^3*(a + b*
Log[c*x^n]))/3 + (d^3*(a + b*Log[c*x^n])^2)/(2*b*n)
```

3.23.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 119, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x} \, dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int \left(\frac{\log(x)d^3}{x}+\frac{1}{6}e\left(18d^2+9exd+2e^2x^2\right)\right)dx+d^3\log(x)\left(a+b\log(cx^n)\right)+3d^2ex(a+b\log(cx^n))+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))$$

$$\Big\downarrow \text{ 2009}$$

$$d^3\log(x)\left(a+b\log(cx^n)\right)+3d^2ex(a+b\log(cx^n))+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))-bn\left(\frac{1}{2}d^3\log^2(x)+3d^2ex+\frac{3}{4}de^2x^2+\frac{e^3x^3}{9}\right)$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
-(b*n*(3*d^2*e*x + (3*d*e^2*x^2)/4 + (e^3*x^3)/9 + (d^3*Log[x]^2)/2)) + 3*
d^2*e*x*(a + b*Log[c*x^n]) + (3*d*e^2*x^2*(a + b*Log[c*x^n]))/2 + (e^3*x^3
*(a + b*Log[c*x^n]))/3 + d^3*Log[x]*(a + b*Log[c*x^n])
```

3.23.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.23.4 Maple [A] (verified)

Time = 0.53 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.18

method	result
parallelrisch	$\frac{12x^3\ln(cx^n)be^3n-4x^3be^3n^2+12x^3ae^3n+54x^2\ln(cx^n)bde^2n-27x^2bde^2n^2+54x^2ade^2n+108x\ln(cx^n)bd^2en-108xbd^2en}{36n}$
risch	$\frac{\ln(c)be^3x^3}{3}-\frac{3i\pi bde^2x^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(icx^n)}{4}-\frac{3i\pi bd^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(icx^n)ex}{2}-i\ln(x)\pi bd^3\,\mathrm{csgn}(ic$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/36*(12*x^3*ln(c*x^n)*b*e^3*n-4*x^3*b*e^3*n^2+12*x^3*a*e^3*n+54*x^2*ln(c*
x^n)*b*d*e^2*n-27*x^2*b*d*e^2*n^2+54*x^2*a*d*e^2*n+108*x*ln(c*x^n)*b*d^2*e
*n-108*x*b*d^2*e*n^2+36*ln(x)*a*d^3*n+108*x*a*d^2*e*n+18*b*d^3*ln(c*x^n)^2
)/n
```

3.23.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.22

$$\begin{aligned}\int\frac{(d+ex)^3\,(a+b\log(cx^n))}{x}\,dx &= \frac{1}{2}\,bd^3n\log(x)^2-\frac{1}{9}\left(be^3n-3\,ae^3\right)x^3-\frac{3}{4}\left(bde^2n-2\,ade^2\right)x^2\\&\quad-3\left(bd^2en-ad^2e\right)x+\frac{1}{6}\left(2\,be^3x^3+9\,bde^2x^2+18\,bd^2ex\right)\log(c)\\&\quad+\frac{1}{6}\left(2\,be^3nx^3+9\,bde^2nx^2+18\,bd^2enx+6\,bd^3\log(c)+6\,ad^3\right)\log(x)\end{aligned}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*b*d^3*n*log(x)^2 - 1/9*(b*e^3*n - 3*a*e^3)*x^3 - 3/4*(b*d*e^2*n - 2*a*
d*e^2)*x^2 - 3*(b*d^2*e*n - a*d^2*e)*x + 1/6*(2*b*e^3*x^3 + 9*b*d*e^2*x^2
+ 18*b*d^2*e*x)*log(c) + 1/6*(2*b*e^3*n*x^3 + 9*b*d*e^2*n*x^2 + 18*b*d^2*e
*n*x + 6*b*d^3*log(c) + 6*a*d^3)*log(x)
```

3.23.6 Sympy [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 199, normalized size of antiderivative = 1.63

$$\int \frac{(d+ex)^3\,(a+b\log{(cx^n)})}{x}\,dx$$
$$= \begin{cases} \frac{ad^3\log{(cx^n)}}{n} + 3ad^2ex + \frac{3ade^2x^2}{2} + \frac{ae^3x^3}{3} + \frac{bd^3\log{(cx^n)}^2}{2n} - 3bd^2enx + 3bd^2ex\log{(cx^n)} - \frac{3bde^2nx^2}{4} + \frac{3bde^2x^2\log{(}}{2} \\ (a+b\log{(c)})\left(d^3\log{(x)} + 3d^2ex + \frac{3de^2x^2}{2} + \frac{e^3x^3}{3}\right) \end{cases}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise((a*d**3*log(c*x**n)/n + 3*a*d**2*e*x + 3*a*d*e**2*x**2/2 + a*e**
3*x**3/3 + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*e*n*x + 3*b*d**2*e*x*log
(c*x**n) - 3*b*d*e**2*n*x**2/4 + 3*b*d*e**2*x**2*log(c*x**n)/2 - b*e**3*n*
x**3/9 + b*e**3*x**3*log(c*x**n)/3, Ne(n, 0)), ((a + b*log(c))*(d**3*log(x
) + 3*d**2*e*x + 3*d*e**2*x**2/2 + e**3*x**3/3), True))
```

3.23.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.04

$$\int \frac{(d+ex)^3\,(a+b\log{(cx^n)})}{x}\,dx = -\frac{1}{9}\,be^3nx^3 + \frac{1}{3}\,be^3x^3\log{(cx^n)} - \frac{3}{4}\,bde^2nx^2 + \frac{1}{3}\,ae^3x^3 + \frac{3}{2}\,bde^2x^2\log{(cx^n)} - 3\,bd^2enx + \frac{3}{2}\,ade^2x^2 + 3\,bd^2ex\log{(cx^n)} + 3\,ad^2ex + \frac{bd^3\log{(cx^n)}^2}{2\,n} + ad^3\log{(x)}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
-1/9*b*e^3*n*x^3 + 1/3*b*e^3*x^3*log(c*x^n) - 3/4*b*d*e^2*n*x^2 + 1/3*a*e^
3*x^3 + 3/2*b*d*e^2*x^2*log(c*x^n) - 3*b*d^2*e*n*x + 3/2*a*d*e^2*x^2 + 3*b
*d^2*e*x*log(c*x^n) + 3*a*d^2*e*x + 1/2*b*d^3*log(c*x^n)^2/n + a*d^3*log(x
)
```

3.23.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 145, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x}\,dx = \frac{1}{2}bd^3n\log(x)^2 - \frac{1}{9}\left(be^3n - 3\,be^3\log(c) - 3\,ae^3\right)x^3 - \frac{3}{4}\left(bde^2n - 2\,bde^2\log(c) - 2\,ade^2\right)x^2 - 3\left(bd^2en - bd^2e\log(c) - ad^2e\right)x + \frac{1}{6}\left(2\,be^3nx^3 + 9\,bde^2nx^2 + 18\,bd^2enx\right)\log(x) + \left(bd^3\log(c) + ad^3\right)\log(x)$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
1/2*b*d^3*n*log(x)^2 - 1/9*(b*e^3*n - 3*b*e^3*log(c) - 3*a*e^3)*x^3 - 3/4*
(b*d*e^2*n - 2*b*d*e^2*log(c) - 2*a*d*e^2)*x^2 - 3*(b*d^2*e*n - b*d^2*e*lo
g(c) - a*d^2*e)*x + 1/6*(2*b*e^3*n*x^3 + 9*b*d*e^2*n*x^2 + 18*b*d^2*e*n*x)
*log(x) + (b*d^3*log(c) + a*d^3)*log(x)
```

3.23.9 Mupad [B] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 106, normalized size of antiderivative = 0.87

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x}\,dx = \ln(c\,x^n)\,\left(3\,b\,d^2\,e\,x + \frac{3\,b\,d\,e^2\,x^2}{2} + \frac{b\,e^3\,x^3}{3}\right) + \frac{e^3\,x^3\,(3\,a-b\,n)}{9} + a\,d^3\,\ln(x) + \frac{b\,d^3\,\ln(c\,x^n)^2}{2\,n} + \frac{3\,d\,e^2\,x^2\,(2\,a-b\,n)}{4} + 3\,d^2\,e\,x\,(a-b\,n)$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x,x)
```

output
```
log(c*x^n)*((b*e^3*x^3)/3 + 3*b*d^2*e*x + (3*b*d*e^2*x^2)/2) + (e^3*x^3*(3
*a - b*n))/9 + a*d^3*log(x) + (b*d^3*log(c*x^n)^2)/(2*n) + (3*d*e^2*x^2*(2
*a - b*n))/4 + 3*d^2*e*x*(a - b*n)
```

3.23. $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x}\,dx$

3.24 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^2}\,dx$

3.24.1 Optimal result

Integrand size = 21, antiderivative size = 119

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^3n}{x} - 3bde^2nx - \frac{1}{4}be^3nx^2 - \frac{3}{2}bd^2en\log^2(x) - \frac{d^3(a+b\log(cx^n))}{x} + 3de^2x(a+b\log(cx^n)) + \frac{1}{2}e^3x^2(a+b\log(cx^n)) + 3d^2e\log(x)\,(a+b\log(cx^n))$$

output
```
-b*d^3*n/x-3*b*d*e^2*n*x-1/4*b*e^3*n*x^2-3/2*b*d^2*e*n*ln(x)^2-d^3*(a+b*ln
(c*x^n))/x+3*d*e^2*x*(a+b*ln(c*x^n))+1/2*e^3*x^2*(a+b*ln(c*x^n))+3*d^2*e*l
n(x)*(a+b*ln(c*x^n))
```

3.24.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 118, normalized size of antiderivative = 0.99

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^3n}{x} + 3ade^2x - 3bde^2nx - \frac{1}{4}be^3nx^2 + 3bde^2x\log(cx^n) - \frac{d^3(a+b\log(cx^n))}{x} + \frac{1}{2}e^3x^2(a+b\log(cx^n)) + \frac{3d^2e(a+b\log(cx^n))^2}{2bn}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((b*d^3*n)/x) + 3*a*d*e^2*x - 3*b*d*e^2*n*x - (b*e^3*n*x^2)/4 + 3*b*d*e^2
*x*Log[c*x^n] - (d^3*(a + b*Log[c*x^n]))/x + (e^3*x^2*(a + b*Log[c*x^n]))/
2 + (3*d^2*e*(a + b*Log[c*x^n])^2)/(2*b*n)
```

3.24.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 115, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^2} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(-\frac{d^3}{x^2}+\frac{3e\log(x)d^2}{x}+3e^2d+\frac{e^3x}{2}\right)dx-\frac{d^3(a+b\log(cx^n))}{x}+ 3d^2e\log(x)(a+b\log(cx^n))+3de^2x(a+b\log(cx^n))+\frac{1}{2}e^3x^2(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{x}+3d^2e\log(x)(a+b\log(cx^n))+3de^2x(a+b\log(cx^n))+ \frac{1}{2}e^3x^2(a+b\log(cx^n))-bn\left(\frac{d^3}{x}+\frac{3}{2}d^2e\log^2(x)+3de^2x+\frac{e^3x^2}{4}\right)$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-(b*n*(d^3/x + 3*d*e^2*x + (e^3*x^2)/4 + (3*d^2*e*Log[x]^2)/2)) - (d^3*(a
+ b*Log[c*x^n]))/x + 3*d*e^2*x*(a + b*Log[c*x^n]) + (e^3*x^2*(a + b*Log[c*
x^n]))/2 + 3*d^2*e*Log[x]*(a + b*Log[c*x^n])
```

3.24.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.24.4 Maple [A] (verified)

Time = 0.85 (sec) , antiderivative size = 145, normalized size of antiderivative = 1.22

method	result
parallelrisch	$\frac{2x^3\ln(c\,x^n)b\,e^3n-x^3b\,e^3n^2+2x^3a\,e^3n+12x^2\ln(c\,x^n)bd\,e^2n-12x^2bd\,e^2n^2+12\ln(x)xa\,d^2en+12x^2ad\,e^2n+6e\,d^2b\ln(c\,x^n)^2x-}{4xn}$
risch	$-\frac{b(-e^3x^3-6e\,d^2\ln(x)x-6d\,e^2x^2+2d^3)\ln(x^n)}{2x}-\frac{-2\ln(c)b\,e^3x^3+6i\ln(x)\pi b\,d^2e\,\mathrm{csgn}(ic\,x^n)^3x+6i\pi bd\,e^2x^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
1/4/x*(2*x^3*ln(c*x^n)*b*e^3*n-x^3*b*e^3*n^2+2*x^3*a*e^3*n+12*x^2*ln(c*x^n
)*b*d*e^2*n-12*x^2*b*d*e^2*n^2+12*ln(x)*x*a*d^2*e*n+12*x^2*a*d*e^2*n+6*e*d
^2*b*ln(c*x^n)^2*x-4*ln(c*x^n)*b*d^3*n-4*b*d^3*n^2-4*a*d^3*n)/n
```

3.24.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.25

$$\int\frac{(d+ex)^3\left(a+b\log\left(cx^n\right)\right)}{x^2}\,dx$$
$$=\frac{6\,bd^2enx\log\left(x\right)^2-4\,bd^3n-4\,ad^3-(be^3n-2\,ae^3)x^3-12\,(bde^2n-ade^2)x^2+2\,(be^3x^3+6\,bde^2x^2-2\,bd}{4\,x}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
1/4*(6*b*d^2*e*n*x*log(x)^2 - 4*b*d^3*n - 4*a*d^3 - (b*e^3*n - 2*a*e^3)*x^
3 - 12*(b*d*e^2*n - a*d*e^2)*x^2 + 2*(b*e^3*x^3 + 6*b*d*e^2*x^2 - 2*b*d^3)
*log(c) + 2*(b*e^3*n*x^3 + 6*b*d*e^2*n*x^2 + 6*b*d^2*e*x*log(c) - 2*b*d^3*
n + 6*a*d^2*e*x)*log(x))/x
```

3.24.6 Sympy [A] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 182, normalized size of antiderivative = 1.53

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^2} dx$$
$$= \begin{cases} -\frac{ad^3}{x} + \frac{3ad^2e\log(cx^n)}{n} + 3ade^2x + \frac{ae^3x^2}{2} - \frac{bd^3n}{x} - \frac{bd^3\log(cx^n)}{x} + \frac{3bd^2e\log(cx^n)^2}{2n} - 3bde^2nx + 3bde^2x\log(cx^n) \\ (a+b\log(c))\left(-\frac{d^3}{x} + 3d^2e\log(x) + 3de^2x + \frac{e^3x^2}{2}\right) \end{cases}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**2,x)
```

output
```
Piecewise((-a*d**3/x + 3*a*d**2*e*log(c*x**n)/n + 3*a*d*e**2*x + a*e**3*x*
*2/2 - b*d**3*n/x - b*d**3*log(c*x**n)/x + 3*b*d**2*e*log(c*x**n)**2/(2*n)
 - 3*b*d*e**2*n*x + 3*b*d*e**2*x*log(c*x**n) - b*e**3*n*x**2/4 + b*e**3*x*
*2*log(c*x**n)/2, Ne(n, 0)), ((a + b*log(c))*(-d**3/x + 3*d**2*e*log(x) +
3*d*e**2*x + e**3*x**2/2), True))
```

3.24.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.07

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^2} dx = -\frac{1}{4}be^3nx^2 + \frac{1}{2}be^3x^2\log(cx^n) - 3bde^2nx + \frac{1}{2}ae^3x^2 + 3bde^2x\log(cx^n) + 3ade^2x + \frac{3bd^2e\log(cx^n)^2}{2n} + 3ad^2e\log(x) - \frac{bd^3n}{x} - \frac{bd^3\log(cx^n)}{x} - \frac{ad^3}{x}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
-1/4*b*e^3*n*x^2 + 1/2*b*e^3*x^2*log(c*x^n) - 3*b*d*e^2*n*x + 1/2*a*e^3*x^
2 + 3*b*d*e^2*x*log(c*x^n) + 3*a*d*e^2*x + 3/2*b*d^2*e*log(c*x^n)^2/n + 3*
a*d^2*e*log(x) - b*d^3*n/x - b*d^3*log(c*x^n)/x - a*d^3/x
```

3.24.8 Giac [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 146, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^2} dx = \frac{1}{2} be^3x^2\log(c) + \frac{3}{2} bd^2en\log(x)^2 + 3(x\log(x)-x)bde^2n + \frac{1}{4}(2x^2\log(x)-x^2)be^3n + \frac{1}{2}ae^3x^2 - bd^3n\left(\frac{\log(x)}{x}+\frac{1}{x}\right) + 3bde^2x\log(c) + 3bd^2e\log(c)\log(|x|) + 3ade^2x + 3ad^2e\log(|x|) - \frac{bd^3\log(c)}{x} - \frac{ad^3}{x}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
1/2*b*e^3*x^2*log(c) + 3/2*b*d^2*e*n*log(x)^2 + 3*(x*log(x) - x)*b*d*e^2*n
 + 1/4*(2*x^2*log(x) - x^2)*b*e^3*n + 1/2*a*e^3*x^2 - b*d^3*n*(log(x)/x +
1/x) + 3*b*d*e^2*x*log(c) + 3*b*d^2*e*log(c)*log(abs(x)) + 3*a*d*e^2*x + 3
*a*d^2*e*log(abs(x)) - b*d^3*log(c)/x - a*d^3/x
```

3.24.9 Mupad [B] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 154, normalized size of antiderivative = 1.29

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^2} dx = \ln(x)\ (3\,a\,d^2\,e + 3\,b\,d^2\,e\,n) - \ln(c\,x^n)\left(\frac{b\,d^3 + 3\,b\,d^2\,e\,x + 3\,b\,d\,e^2\,x^2 + b\,e^3\,x^3}{x} - \frac{\frac{3\,b\,e^3\,x^3}{2} + 6\,b\,d\,e^2\,x^2}{x}\right) - \frac{a\,d^3 + b\,d^3\,n}{x} + \frac{e^3\,x^2\,(2\,a - b\,n)}{4} + 3\,d\,e^2\,x\,(a - b\,n) + \frac{3\,b\,d^2\,e\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^2,x)
```

output
```
log(x)*(3*a*d^2*e + 3*b*d^2*e*n) - log(c*x^n)*((b*d^3 + b*e^3*x^3 + 3*b*d^
2*e*x + 3*b*d*e^2*x^2)/x - ((3*b*e^3*x^3)/2 + 6*b*d*e^2*x^2)/x) - (a*d^3 +
 b*d^3*n)/x + (e^3*x^2*(2*a - b*n))/4 + 3*d*e^2*x*(a - b*n) + (3*b*d^2*e*l
og(c*x^n)^2)/(2*n)
```

3.25 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^3}\,dx$

3.25.1 Optimal result

Integrand size = 21, antiderivative size = 118

$$\begin{aligned}\int \frac{(d+ex)^3\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx =& -\frac{bd^3n}{4x^2}-\frac{3bd^2en}{x}-be^3nx-\frac{3}{2}bde^2n\log^2(x)\\ &-\frac{d^3(a+b\log\left(cx^n\right))}{2x^2}-\frac{3d^2e(a+b\log\left(cx^n\right))}{x}\\ &+e^3x(a+b\log\left(cx^n\right))+3de^2\log(x)\left(a+b\log\left(cx^n\right)\right)\end{aligned}$$

output
```
-1/4*b*d^3*n/x^2-3*b*d^2*e*n/x-b*e^3*n*x-3/2*b*d*e^2*n*ln(x)^2-1/2*d^3*(a+
b*ln(c*x^n))/x^2-3*d^2*e*(a+b*ln(c*x^n))/x+e^3*x*(a+b*ln(c*x^n))+3*d*e^2*l
n(x)*(a+b*ln(c*x^n))
```

3.25.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 115, normalized size of antiderivative = 0.97

$$\begin{aligned}\int \frac{(d+ex)^3\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx =& -\frac{bd^3n}{4x^2}-\frac{3bd^2en}{x}+ae^3x-be^3nx\\ &+be^3x\log\left(cx^n\right)-\frac{d^3(a+b\log\left(cx^n\right))}{2x^2}\\ &-\frac{3d^2e(a+b\log\left(cx^n\right))}{x}+\frac{3de^2(a+b\log\left(cx^n\right))^2}{2bn}\end{aligned}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/4*(b*d^3*n)/x^2 - (3*b*d^2*e*n)/x + a*e^3*x - b*e^3*n*x + b*e^3*x*Log[c
*x^n] - (d^3*(a + b*Log[c*x^n]))/(2*x^2) - (3*d^2*e*(a + b*Log[c*x^n]))/x
+ (3*d*e^2*(a + b*Log[c*x^n])^2)/(2*b*n)
```

3.25.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 114, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^3}\,dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(-\frac{d^3}{2x^3}-\frac{3ed^2}{x^2}+\frac{3e^2\log(x)d}{x}+e^3\right)dx-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2\log(x)\,(a+b\log(cx^n))+e^3x(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2\log(x)\,(a+b\log(cx^n))+e^3x(a+b\log(cx^n))-bn\left(\frac{d^3}{4x^2}+\frac{3d^2e}{x}+\frac{3}{2}de^2\log^2(x)+e^3x\right)$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-(b*n*(d^3/(4*x^2) + (3*d^2*e)/x + e^3*x + (3*d*e^2*Log[x]^2)/2)) - (d^3*(
a + b*Log[c*x^n]))/(2*x^2) - (3*d^2*e*(a + b*Log[c*x^n]))/x + e^3*x*(a + b
*Log[c*x^n]) + 3*d*e^2*Log[x]*(a + b*Log[c*x^n])
```

3.25.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.25.4 Maple [A] (verified)

Time = 0.46 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{4x^3\ln(c\,x^n)b\,e^3n-4x^3b\,e^3n^2+12\ln(x)x^2ad\,e^2n+4x^3a\,e^3n+6e^2db\ln(c\,x^n)^2x^2-12x\ln(c\,x^n)b\,d^2en-12xb\,d^2e\,n^2-12xa\,d^2en-}{4x^2n}$
risch	$-\frac{b\left(-6e^2d\ln(x)x^2-2e^3x^3+6d^2ex+d^3\right)\ln(x^n)}{2x^2}-\frac{-4\ln(c)b\,e^3x^3+6i\ln(x)\pi bd\,e^2\operatorname{csgn}(ic\,x^n)^3x^2-6i\pi b\,d^2\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/4/x^2*(4*x^3*ln(c*x^n)*b*e^3*n-4*x^3*b*e^3*n^2+12*ln(x)*x^2*a*d*e^2*n+4*
x^3*a*e^3*n+6*e^2*d*b*ln(c*x^n)^2*x^2-12*x*ln(c*x^n)*b*d^2*e*n-12*x*b*d^2*
e*n^2-12*x*a*d^2*e*n-2*ln(c*x^n)*b*d^3*n-b*d^3*n^2-2*a*d^3*n)/n
```

3.25.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.27

$$\int \frac{(d+ex)^3\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx = \frac{6\,bde^2nx^2\log\left(x\right)^2-bd^3n-2\,ad^3-4\,(be^3n-ae^3)x^3-12\,(bd^2en+ad^2e)x+2\,(2\,be^3x^3-6\,bd^2ex-bd^3)\,\mathrm{l}}{4\,x^2}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
1/4*(6*b*d*e^2*n*x^2*log(x)^2 - b*d^3*n - 2*a*d^3 - 4*(b*e^3*n - a*e^3)*x^
3 - 12*(b*d^2*e*n + a*d^2*e)*x + 2*(2*b*e^3*x^3 - 6*b*d^2*e*x - b*d^3)*log
(c) + 2*(2*b*e^3*n*x^3 + 6*b*d*e^2*x^2*log(c) - 6*b*d^2*e*n*x + 6*a*d*e^2*
x^2 - b*d^3*n)*log(x))/x^2
```

3.25.6 Sympy [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 182, normalized size of antiderivative = 1.54

$$\int \frac{(d+ex)^3\,(a+b\log{(cx^n)})}{x^3}\,dx$$
$$= \begin{cases} -\frac{ad^3}{2x^2} - \frac{3ad^2e}{x} + \frac{3ade^2\log{(cx^n)}}{n} + ae^3x - \frac{bd^3n}{4x^2} - \frac{bd^3\log{(cx^n)}}{2x^2} - \frac{3bd^2en}{x} - \frac{3bd^2e\log{(cx^n)}}{x} + \frac{3bde^2\log{(cx^n)}^2}{2n} - be^3nx + \\ (a+b\log{(c)})\left(-\frac{d^3}{2x^2} - \frac{3d^2e}{x} + 3de^2\log{(x)} + e^3x\right) \end{cases}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Piecewise((-a*d**3/(2*x**2) - 3*a*d**2*e/x + 3*a*d*e**2*log(c*x**n)/n + a*
e**3*x - b*d**3*n/(4*x**2) - b*d**3*log(c*x**n)/(2*x**2) - 3*b*d**2*e*n/x
- 3*b*d**2*e*log(c*x**n)/x + 3*b*d*e**2*log(c*x**n)**2/(2*n) - b*e**3*n*x
+ b*e**3*x*log(c*x**n), Ne(n, 0)), ((a + b*log(c))*(-d**3/(2*x**2) - 3*d**
2*e/x + 3*d*e**2*log(x) + e**3*x), True))
```

3.25.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 125, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex)^3\,(a+b\log{(cx^n)})}{x^3}\,dx = -be^3nx + be^3x\log{(cx^n)} + ae^3x + \frac{3\,bde^2\log{(cx^n)}^2}{2\,n} + 3\,ade^2\log{(x)} - \frac{3\,bd^2en}{x} - \frac{3\,bd^2e\log{(cx^n)}}{x} - \frac{bd^3n}{4\,x^2} - \frac{3\,ad^2e}{x} - \frac{bd^3\log{(cx^n)}}{2\,x^2} - \frac{ad^3}{2\,x^2}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
-b*e^3*n*x + b*e^3*x*log(c*x^n) + a*e^3*x + 3/2*b*d*e^2*log(c*x^n)^2/n + 3
*a*d*e^2*log(x) - 3*b*d^2*e*n/x - 3*b*d^2*e*log(c*x^n)/x - 1/4*b*d^3*n/x^2
 - 3*a*d^2*e/x - 1/2*b*d^3*log(c*x^n)/x^2 - 1/2*a*d^3/x^2
```

3.25.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^3}\,dx = \frac{3}{2}\,bde^2n\log(x)^2 + (x\log(x)-x)be^3n - 3\,bd^2en\left(\frac{\log(x)}{x}+\frac{1}{x}\right) - \frac{1}{4}\,bd^3n\left(\frac{2\,\log(x)}{x^2}+\frac{1}{x^2}\right) + be^3x\log(c) + 3\,bde^2\log(c)\log(|x|) + ae^3x + 3\,ade^2\log(|x|) - \frac{3\,bd^2e\log(c)}{x} - \frac{3\,ad^2e}{x} - \frac{bd^3\log(c)}{2\,x^2} - \frac{ad^3}{2\,x^2}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
3/2*b*d*e^2*n*log(x)^2 + (x*log(x) - x)*b*e^3*n - 3*b*d^2*e*n*(log(x)/x +
1/x) - 1/4*b*d^3*n*(2*log(x)/x^2 + 1/x^2) + b*e^3*x*log(c) + 3*b*d*e^2*log
(c)*log(abs(x)) + a*e^3*x + 3*a*d*e^2*log(abs(x)) - 3*b*d^2*e*log(c)/x - 3
*a*d^2*e/x - 1/2*b*d^3*log(c)/x^2 - 1/2*a*d^3/x^2
```

3.25.9 Mupad [B] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^3}\,dx = \ln(x)\,\left(3\,a\,d\,e^2+\frac{9\,b\,d\,e^2\,n}{2}\right) - \ln(c\,x^n)\,\left(\frac{\frac{b\,d^3}{2}+3\,b\,d^2\,e\,x+\frac{9\,b\,d\,e^2\,x^2}{2}+2\,b\,e^3\,x^3}{x^2} - 3\,b\,e^3\,x\right) - \frac{x\,(6\,a\,d^2\,e+6\,b\,d^2\,e\,n)+a\,d^3+\frac{b\,d^3\,n}{2}}{2\,x^2} + e^3\,x\,(a-b\,n) + \frac{3\,b\,d\,e^2\,\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^3,x)
```

output
```
log(x)*(3*a*d*e^2 + (9*b*d*e^2*n)/2) - log(c*x^n)*(((b*d^3)/2 + 2*b*e^3*x^
3 + 3*b*d^2*e*x + (9*b*d*e^2*x^2)/2)/x^2 - 3*b*e^3*x) - (x*(6*a*d^2*e + 6*
b*d^2*e*n) + a*d^3 + (b*d^3*n)/2)/(2*x^2) + e^3*x*(a - b*n) + (3*b*d*e^2*l
og(c*x^n)^2)/(2*n)
```

3.26 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^4}\,dx$

3.26.1 Optimal result

Integrand size = 21, antiderivative size = 126

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4}\,dx = -\frac{bd^3n}{9x^3}-\frac{3bd^2en}{4x^2}-\frac{3bde^2n}{x}-\frac{1}{2}be^3n\log^2(x)-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3\log(x)\,(a+b\log(cx^n))$$

output
```
-1/9*b*d^3*n/x^3-3/4*b*d^2*e*n/x^2-3*b*d*e^2*n/x-1/2*b*e^3*n*ln(x)^2-1/3*d
^3*(a+b*ln(c*x^n))/x^3-3/2*d^2*e*(a+b*ln(c*x^n))/x^2-3*d*e^2*(a+b*ln(c*x^n
))/x+e^3*ln(x)*(a+b*ln(c*x^n))
```

3.26.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 122, normalized size of antiderivative = 0.97

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4}\,dx = -\frac{bd^3n}{9x^3}-\frac{3bd^2en}{4x^2}-\frac{3bde^2n}{x}-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}-\frac{3de^2(a+b\log(cx^n))}{x}+\frac{e^3(a+b\log(cx^n))^2}{2bn}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/9*(b*d^3*n)/x^3 - (3*b*d^2*e*n)/(4*x^2) - (3*b*d*e^2*n)/x - (d^3*(a + b
*Log[c*x^n]))/(3*x^3) - (3*d^2*e*(a + b*Log[c*x^n]))/(2*x^2) - (3*d*e^2*(a
 + b*Log[c*x^n]))/x + (e^3*(a + b*Log[c*x^n])^2)/(2*b*n)
```

3.26.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 123, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4} \, dx$$

$$\Big\downarrow \ 2772$$

$$-bn\int \left(\frac{e^3\log(x)}{x}-\frac{d(2d^2+9exd+18e^2x^2)}{6x^4}\right)dx-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3\log(x)(a+b\log(cx^n))$$

$$\Big\downarrow \ 2009$$

$$-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3\log(x)(a+b\log(cx^n))-bn\left(\frac{d^3}{9x^3}+\frac{3d^2e}{4x^2}+\frac{3de^2}{x}+\frac{1}{2}e^3\log^2(x)\right)$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-(b*n*(d^3/(9*x^3) + (3*d^2*e)/(4*x^2) + (3*d*e^2)/x + (e^3*Log[x]^2)/2))
- (d^3*(a + b*Log[c*x^n]))/(3*x^3) - (3*d^2*e*(a + b*Log[c*x^n]))/(2*x^2)
- (3*d*e^2*(a + b*Log[c*x^n]))/x + e^3*Log[x]*(a + b*Log[c*x^n])
```

3.26.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.26.4 Maple [A] (verified)

Time = 0.50 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.14

method	result
parallelrisch	$\frac{36\ln(x)x^3 a e^3 n+18e^3 b\ln(c x^n)^2 x^3-108x^2\ln(c x^n) b d e^2 n-108x^2 b d e^2 n^2-108x^2 a d e^2 n-54x\ln(c x^n) b d^2 e n-27x b d^2 e n^2-54x}{36x^3 n}$
risch	$-\frac{b(-6e^3\ln(x)x^3+18d e^2x^2+9d^2ex+2d^3)\ln(x^n)}{6x^3}-\frac{-54i\pi b d e^2x^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)-27i\pi b\,d^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
1/36/x^3*(36*ln(x)*x^3*a*e^3*n+18*e^3*b*ln(c*x^n)^2*x^3-108*x^2*ln(c*x^n)*
b*d*e^2*n-108*x^2*b*d*e^2*n^2-108*x^2*a*d*e^2*n-54*x*ln(c*x^n)*b*d^2*e*n-2
7*x*b*d^2*e*n^2-54*x*a*d^2*e*n-12*ln(c*x^n)*b*d^3*n-4*b*d^3*n^2-12*a*d^3*n
)/n
```

3.26.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 151, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex)^3\,(a+b\log(cx^n))}{x^4}\,dx$$
$$=\frac{18\,be^3nx^3\log(x)^2-4\,bd^3n-12\,ad^3-108\,(bde^2n+ade^2)x^2-27\,(bd^2en+2\,ad^2e)x-6\,(18\,bde^2x^2+9\,bd}{36\,x^3}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
1/36*(18*b*e^3*n*x^3*log(x)^2 - 4*b*d^3*n - 12*a*d^3 - 108*(b*d*e^2*n + a*
d*e^2)*x^2 - 27*(b*d^2*e*n + 2*a*d^2*e)*x - 6*(18*b*d*e^2*x^2 + 9*b*d^2*e*
x + 2*b*d^3)*log(c) + 6*(6*b*e^3*x^3*log(c) - 18*b*d*e^2*n*x^2 + 6*a*e^3*x
^3 - 9*b*d^2*e*n*x - 2*b*d^3*n)*log(x))/x^3
```

3.26.6 Sympy [A] (verification not implemented)

Time = 2.46 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.14

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4}\,dx = -\frac{ad^3}{3x^3} - \frac{3ad^2e}{2x^2} - \frac{3ade^2}{x} + ae^3\log(x) + bd^3\left(-\frac{n}{9x^3} - \frac{\log(cx^n)}{3x^3}\right) + 3bd^2e\left(-\frac{n}{4x^2} - \frac{\log(cx^n)}{2x^2}\right) + 3bde^2\left(-\frac{n}{x} - \frac{\log(cx^n)}{x}\right) - be^3\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right)$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d**3/(3*x**3) - 3*a*d**2*e/(2*x**2) - 3*a*d*e**2/x + a*e**3*log(x) + b*
d**3*(-n/(9*x**3) - log(c*x**n)/(3*x**3)) + 3*b*d**2*e*(-n/(4*x**2) - log(
c*x**n)/(2*x**2)) + 3*b*d*e**2*(-n/x - log(c*x**n)/x) - b*e**3*Piecewise((
-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

3.26.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4}\,dx = \frac{be^3\log(cx^n)^2}{2n} + ae^3\log(x) - \frac{3bde^2n}{x} - \frac{3bde^2\log(cx^n)}{x} - \frac{3bd^2en}{4x^2} - \frac{3ade^2}{x} - \frac{3bd^2e\log(cx^n)}{2x^2} - \frac{bd^3n}{9x^3} - \frac{3ad^2e}{2x^2} - \frac{bd^3\log(cx^n)}{3x^3} - \frac{ad^3}{3x^3}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
1/2*b*e^3*log(c*x^n)^2/n + a*e^3*log(x) - 3*b*d*e^2*n/x - 3*b*d*e^2*log(c*
x^n)/x - 3/4*b*d^2*e*n/x^2 - 3*a*d*e^2/x - 3/2*b*d^2*e*log(c*x^n)/x^2 - 1/
9*b*d^3*n/x^3 - 3/2*a*d^2*e/x^2 - 1/3*b*d^3*log(c*x^n)/x^3 - 1/3*a*d^3/x^3
```

3.26.8 Giac [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4}\,dx = \frac{1}{2}be^3n\log(x)^2 - 3\,bde^2n\left(\frac{\log(x)}{x} + \frac{1}{x}\right) - \frac{3}{4}\,bd^2en\left(\frac{2\,\log(x)}{x^2} + \frac{1}{x^2}\right) - \frac{1}{9}\,bd^3n\left(\frac{3\,\log(x)}{x^3} + \frac{1}{x^3}\right) + be^3\log(c)\log(|x|) + ae^3\log(|x|) - \frac{3\,bde^2\log(c)}{x} - \frac{3\,ade^2}{x} - \frac{3\,bd^2e\log(c)}{2\,x^2} - \frac{3\,ad^2e}{2\,x^2} - \frac{bd^3\log(c)}{3\,x^3} - \frac{ad^3}{3\,x^3}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
1/2*b*e^3*n*log(x)^2 - 3*b*d*e^2*n*(log(x)/x + 1/x) - 3/4*b*d^2*e*n*(2*log
(x)/x^2 + 1/x^2) - 1/9*b*d^3*n*(3*log(x)/x^3 + 1/x^3) + b*e^3*log(c)*log(a
bs(x)) + a*e^3*log(abs(x)) - 3*b*d*e^2*log(c)/x - 3*a*d*e^2/x - 3/2*b*d^2*
e*log(c)/x^2 - 3/2*a*d^2*e/x^2 - 1/3*b*d^3*log(c)/x^3 - 1/3*a*d^3/x^3
```

3.26.9 Mupad [B] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 136, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^4}\,dx = \ln(x)\left(a\,e^3 + \frac{11\,b\,e^3\,n}{6}\right) - \frac{x\left(9\,a\,d^2\,e + \frac{9\,b\,d^2\,e\,n}{2}\right) + 2\,a\,d^3 + x^2\left(18\,a\,d\,e^2 + 18\,b\,d\,e^2\,n\right) + \frac{2\,b\,d^3\,n}{3}}{6\,x^3} - \frac{\ln(c\,x^n)\left(\frac{b\,d^3}{3} + \frac{3\,b\,d^2\,e\,x}{2} + 3\,b\,d\,e^2\,x^2 + \frac{11\,b\,e^3\,x^3}{6}\right)}{x^3} + \frac{b\,e^3\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^4,x)
```

output
```
log(x)*(a*e^3 + (11*b*e^3*n)/6) - (x*(9*a*d^2*e + (9*b*d^2*e*n)/2) + 2*a*d
^3 + x^2*(18*a*d*e^2 + 18*b*d*e^2*n) + (2*b*d^3*n)/3)/(6*x^3) - (log(c*x^n
)*((b*d^3)/3 + (11*b*e^3*x^3)/6 + (3*b*d^2*e*x)/2 + 3*b*d*e^2*x^2))/x^3 +
(b*e^3*log(c*x^n)^2)/(2*n)
```

3.26. $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^4}\,dx$

3.27 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^5} \, dx$

3.27.1 Optimal result

Integrand size = 21, antiderivative size = 90

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^5} \, dx = -\frac{bd^3n}{16x^4} - \frac{bd^2en}{3x^3} - \frac{3bde^2n}{4x^2} - \frac{be^3n}{x} + \frac{be^4n\log(x)}{4d} - \frac{(d+ex)^4 (a+b\log(cx^n))}{4dx^4}$$

output
```
-1/16*b*d^3*n/x^4-1/3*b*d^2*e*n/x^3-3/4*b*d*e^2*n/x^2-b*e^3*n/x+1/4*b*e^4*
n*ln(x)/d-1/4*(e*x+d)^4*(a+b*ln(c*x^n))/d/x^4
```

3.27.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^5} \, dx = -\frac{12a(d^3+4d^2ex+6de^2x^2+4e^3x^3)+bn(3d^3+16d^2ex+36de^2x^2+48e^3x^3)+12b(d^3+4d^2ex+6de^2x^2 \cdots}{48x^4}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
-1/48*(12*a*(d^3 + 4*d^2*e*x + 6*d*e^2*x^2 + 4*e^3*x^3) + b*n*(3*d^3 + 16*
d^2*e*x + 36*d*e^2*x^2 + 48*e^3*x^3) + 12*b*(d^3 + 4*d^2*e*x + 6*d*e^2*x^2
 + 4*e^3*x^3)*Log[c*x^n])/x^4
```

3.27.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 85, normalized size of antiderivative = 0.94, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2772, 27, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^5} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{(d+ex)^4}{4dx^5}dx-\frac{(d+ex)^4 (a+b\log(cx^n))}{4dx^4}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(d+ex)^4}{x^5}dx}{4d}-\frac{(d+ex)^4 (a+b\log(cx^n))}{4dx^4}$$

$$\Big\downarrow \text{49}$$

$$\frac{bn\int \left(\frac{d^4}{x^5}+\frac{4ed^3}{x^4}+\frac{6e^2d^2}{x^3}+\frac{4e^3d}{x^2}+\frac{e^4}{x}\right)dx}{4d}-\frac{(d+ex)^4 (a+b\log(cx^n))}{4dx^4}$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(-\frac{d^4}{4x^4}-\frac{4d^3e}{3x^3}-\frac{3d^2e^2}{x^2}-\frac{4de^3}{x}+e^4\log(x)\right)}{4d}-\frac{(d+ex)^4 (a+b\log(cx^n))}{4dx^4}$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-1/4*d^4/x^4 - (4*d^3*e)/(3*x^3) - (3*d^2*e^2)/x^2 - (4*d*e^3)/x + e
^4*Log[x]))/(4*d) - ((d + e*x)^4*(a + b*Log[c*x^n]))/(4*d*x^4)
```

3.27.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.27.4 Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 134, normalized size of antiderivative = 1.49

method	result
parallelrisch	$-\frac{48b\ln(c\,x^{n})e^{3}x^{3}+48b\,e^{3}n\,x^{3}+48a\,e^{3}x^{3}+72b\ln(c\,x^{n})d\,e^{2}x^{2}+36bd\,e^{2}n\,x^{2}+72ad\,e^{2}x^{2}+48b\ln(c\,x^{n})d^{2}ex+16b\,d^{2}enx+48a\,d^{2}e}{48x^{4}}$
risch	$-\frac{b\left(4e^{3}x^{3}+6d\,e^{2}x^{2}+4d^{2}ex+d^{3}\right)\ln(x^{n})}{4x^{4}}-\frac{48\ln(c)b\,e^{3}x^{3}-36i\pi bd\,e^{2}x^{2}\operatorname{csgn}(ic)\operatorname{csgn}(ix^{n})\operatorname{csgn}(ic\,x^{n})-24i\pi b\,d^{2}\operatorname{csgn}(ic)\operatorname{csgn}}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/48/x^4*(48*b*ln(c*x^n)*e^3*x^3+48*b*e^3*n*x^3+48*a*e^3*x^3+72*b*ln(c*x^
n)*d*e^2*x^2+36*b*d*e^2*n*x^2+72*a*d*e^2*x^2+48*b*ln(c*x^n)*d^2*e*x+16*b*d
^2*e*n*x+48*a*d^2*e*x+12*b*ln(c*x^n)*d^3+3*b*d^3*n+12*a*d^3)
```

3.27.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.69

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^5}\,dx =$$
$$-\frac{3\,bd^3n + 12\,ad^3 + 48\,(be^3n + ae^3)x^3 + 36\,(bde^2n + 2\,ade^2)x^2 + 16\,(bd^2en + 3\,ad^2e)x + 12\,(4\,be^3x^3 + 6\,b}{48\,x^4}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
-1/48*(3*b*d^3*n + 12*a*d^3 + 48*(b*e^3*n + a*e^3)*x^3 + 36*(b*d*e^2*n + 2
*a*d*e^2)*x^2 + 16*(b*d^2*e*n + 3*a*d^2*e)*x + 12*(4*b*e^3*x^3 + 6*b*d*e^2
*x^2 + 4*b*d^2*e*x + b*d^3)*log(c) + 12*(4*b*e^3*n*x^3 + 6*b*d*e^2*n*x^2 +
 4*b*d^2*e*n*x + b*d^3*n)*log(x))/x^4
```

3.27.6 Sympy [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 158, normalized size of antiderivative = 1.76

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^5}\,dx = -\frac{ad^3}{4x^4} - \frac{ad^2e}{x^3} - \frac{3ade^2}{2x^2} - \frac{ae^3}{x} - \frac{bd^3n}{16x^4} - \frac{bd^3\log(cx^n)}{4x^4} - \frac{bd^2en}{3x^3} - \frac{bd^2e\log(cx^n)}{x^3} - \frac{3bde^2n}{4x^2} - \frac{3bde^2\log(cx^n)}{2x^2} - \frac{be^3n}{x} - \frac{be^3\log(cx^n)}{x}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**5,x)
```

output
```
-a*d**3/(4*x**4) - a*d**2*e/x**3 - 3*a*d*e**2/(2*x**2) - a*e**3/x - b*d**3
*n/(16*x**4) - b*d**3*log(c*x**n)/(4*x**4) - b*d**2*e*n/(3*x**3) - b*d**2*
e*log(c*x**n)/x**3 - 3*b*d*e**2*n/(4*x**2) - 3*b*d*e**2*log(c*x**n)/(2*x**
2) - b*e**3*n/x - b*e**3*log(c*x**n)/x
```

3.27.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.59

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^5}\,dx = -\frac{be^3n}{x} - \frac{be^3\log(cx^n)}{x} - \frac{3\,bde^2n}{4\,x^2} - \frac{ae^3}{x} - \frac{3\,bde^2\log(cx^n)}{2\,x^2} - \frac{bd^2en}{3\,x^3} - \frac{3\,ade^2}{2\,x^2} - \frac{bd^2e\log(cx^n)}{x^3} - \frac{bd^3n}{16\,x^4} - \frac{ad^2e}{x^3} - \frac{bd^3\log(cx^n)}{4\,x^4} - \frac{ad^3}{4\,x^4}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
-b*e^3*n/x - b*e^3*log(c*x^n)/x - 3/4*b*d*e^2*n/x^2 - a*e^3/x - 3/2*b*d*e^
2*log(c*x^n)/x^2 - 1/3*b*d^2*e*n/x^3 - 3/2*a*d*e^2/x^2 - b*d^2*e*log(c*x^n
)/x^3 - 1/16*b*d^3*n/x^4 - a*d^2*e/x^3 - 1/4*b*d^3*log(c*x^n)/x^4 - 1/4*a*
d^3/x^4
```

3.27.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 162 vs. 2(80) = 160.

Time = 0.36 (sec) , antiderivative size = 162, normalized size of antiderivative = 1.80

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^5}\,dx = -\frac{(4\,be^3nx^3 + 6\,bde^2nx^2 + 4\,bd^2enx + bd^3n)\log(x)}{4\,x^4} - \frac{48\,be^3nx^3 + 48\,be^3x^3\log(c) + 36\,bde^2nx^2 + 48\,ae^3x^3 + 72\,bde^2x^2\log(c) + 16\,bd^2enx + 72\,ade^2x^2 + 48\,b}{48\,x^4}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
-1/4*(4*b*e^3*n*x^3 + 6*b*d*e^2*n*x^2 + 4*b*d^2*e*n*x + b*d^3*n)*log(x)/x^
4 - 1/48*(48*b*e^3*n*x^3 + 48*b*e^3*x^3*log(c) + 36*b*d*e^2*n*x^2 + 48*a*e
^3*x^3 + 72*b*d*e^2*x^2*log(c) + 16*b*d^2*e*n*x + 72*a*d*e^2*x^2 + 48*b*d^
2*e*x*log(c) + 3*b*d^3*n + 48*a*d^2*e*x + 12*b*d^3*log(c) + 12*a*d^3)/x^4
```

3.27.9 Mupad [B] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.31

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^5}\,dx$$
$$= -\frac{x^3 (4\,a\,e^3+4\,b\,e^3\,n)+x\left(4\,a\,d^2\,e+\frac{4\,b\,d^2\,e\,n}{3}\right)+a\,d^3+x^2 (6\,a\,d\,e^2+3\,b\,d\,e^2\,n)+\frac{b\,d^3\,n}{4}}{4\,x^4}$$
$$-\frac{\ln(c\,x^n)\left(\frac{b\,d^3}{4}+b\,d^2\,e\,x+\frac{3\,b\,d\,e^2\,x^2}{2}+b\,e^3\,x^3\right)}{x^4}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^5,x)
```

output
```
- (x^3*(4*a*e^3 + 4*b*e^3*n) + x*(4*a*d^2*e + (4*b*d^2*e*n)/3) + a*d^3 + x
^2*(6*a*d*e^2 + 3*b*d*e^2*n) + (b*d^3*n)/4)/(4*x^4) - (log(c*x^n)*((b*d^3)
/4 + b*e^3*x^3 + b*d^2*e*x + (3*b*d*e^2*x^2)/2))/x^4
```

3.28 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^6}\,dx$

3.28.1 Optimal result

Integrand size = 21, antiderivative size = 142

$$\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^6}\,dx = \frac{bd^2en}{80x^4}+\frac{bde^2n}{15x^3}+\frac{3be^3n}{20x^2}+\frac{be^4n}{5dx}-\frac{bn(d+ex)^5}{25d^2x^5}-\frac{be^5n\log(x)}{20d^2} -\frac{(d+ex)^4(a+b\log(cx^n))}{5dx^5}+\frac{e(d+ex)^4(a+b\log(cx^n))}{20d^2x^4}$$

output
```
1/80*b*d^2*e*n/x^4+1/15*b*d*e^2*n/x^3+3/20*b*e^3*n/x^2+1/5*b*e^4*n/d/x-1/2
5*b*n*(e*x+d)^5/d^2/x^5-1/20*b*e^5*n*ln(x)/d^2-1/5*(e*x+d)^4*(a+b*ln(c*x^n
))/d/x^5+1/20*e*(e*x+d)^4*(a+b*ln(c*x^n))/d^2/x^4
```

3.28.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.80

$$\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^6}\,dx = -\frac{60a(4d^3+15d^2ex+20de^2x^2+10e^3x^3)+bn(48d^3+225d^2ex+400de^2x^2+300e^3x^3)+60b(4d^3+15d^2}{1200x^5}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/1200*(60*a*(4*d^3 + 15*d^2*e*x + 20*d*e^2*x^2 + 10*e^3*x^3) + b*n*(48*d
^3 + 225*d^2*e*x + 400*d*e^2*x^2 + 300*e^3*x^3) + 60*b*(4*d^3 + 15*d^2*e*x
 + 20*d*e^2*x^2 + 10*e^3*x^3)*Log[c*x^n])/x^5
```

3.28.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 131, normalized size of antiderivative = 0.92, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {2772, 27, 87, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^6} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{(4d-ex)(d+ex)^4}{20d^2x^6}dx+\frac{e(d+ex)^4 (a+b\log(cx^n))}{20d^2x^4}-\frac{(d+ex)^4 (a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(4d-ex)(d+ex)^4}{x^6}dx}{20d^2}+\frac{e(d+ex)^4 (a+b\log(cx^n))}{20d^2x^4}-\frac{(d+ex)^4 (a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{87}$$

$$\frac{bn\left(-e\int \frac{(d+ex)^4}{x^5}dx-\frac{4(d+ex)^5}{5x^5}\right)}{20d^2}+\frac{e(d+ex)^4 (a+b\log(cx^n))}{20d^2x^4}-\frac{(d+ex)^4 (a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{49}$$

$$\frac{bn\left(-e\int \left(\frac{d^4}{x^5}+\frac{4ed^3}{x^4}+\frac{6e^2d^2}{x^3}+\frac{4e^3d}{x^2}+\frac{e^4}{x}\right)dx-\frac{4(d+ex)^5}{5x^5}\right)}{20d^2}+\frac{e(d+ex)^4 (a+b\log(cx^n))}{20d^2x^4}-\frac{(d+ex)^4 (a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{2009}$$

$$\frac{e(d+ex)^4 (a+b\log(cx^n))}{20d^2x^4}-\frac{(d+ex)^4 (a+b\log(cx^n))}{5dx^5}+\frac{bn\left(-e\left(-\frac{d^4}{4x^4}-\frac{4d^3e}{3x^3}-\frac{3d^2e^2}{x^2}-\frac{4de^3}{x}+e^4\log(x)\right)-\frac{4(d+ex)^5}{5x^5}\right)}{20d^2}$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*((-4*(d + e*x)^5)/(5*x^5) - e*(-1/4*d^4/x^4 - (4*d^3*e)/(3*x^3) - (3*
d^2*e^2)/x^2 - (4*d*e^3)/x + e^4*Log[x])))/(20*d^2) - ((d + e*x)^4*(a + b*
Log[c*x^n]))/(5*d*x^5) + (e*(d + e*x)^4*(a + b*Log[c*x^n]))/(20*d^2*x^4)
```

3.28.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 87
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[(-(b*e - a*f))*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(f*(p
+ 1)*(c*f - d*e))), x] - Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p
+ 1)))/(f*(p + 1)*(c*f - d*e))   Int[(c + d*x)^n*(e + f*x)^(p + 1), x], x]
/; FreeQ[{a, b, c, d, e, f, n}, x] && LtQ[p, -1] && ( !LtQ[n, -1] || Intege
rQ[p] ||  !(IntegerQ[n] ||  !(EqQ[e, 0] ||  !(EqQ[c, 0] || LtQ[p, n]))))
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.28.4 Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 134, normalized size of antiderivative = 0.94

method	result
parallelrisch	$-\frac{600b\ln(c\,x^n)e^3x^3+300b\,e^3n\,x^3+600a\,e^3x^3+1200b\ln(c\,x^n)d\,e^2x^2+400bd\,e^2n\,x^2+1200ad\,e^2x^2+900b\ln(c\,x^n)d^2ex+225b\,d^2e}{1200x^5}$
risch	$-\frac{b(10e^3x^3+20d\,e^2x^2+15d^2ex+4d^3)\ln(x^n)}{20x^5}-\frac{600\ln(c)b\,e^3x^3-600i\pi bd\,e^2x^2\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)-450i\pi b\,d^2\operatorname{csgn}}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/1200/x^5*(600*b*ln(c*x^n)*e^3*x^3+300*b*e^3*n*x^3+600*a*e^3*x^3+1200*b*
ln(c*x^n)*d*e^2*x^2+400*b*d*e^2*n*x^2+1200*a*d*e^2*x^2+900*b*ln(c*x^n)*d^2
*e*x+225*b*d^2*e*n*x+900*a*d^2*e*x+240*b*ln(c*x^n)*d^3+48*b*d^3*n+240*a*d^
3)
```

3.28.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.09

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^6}\,dx = -\frac{48\,bd^3n + 240\,ad^3 + 300\,(be^3n + 2\,ae^3)x^3 + 400\,(bde^2n + 3\,ade^2)x^2 + 225\,(bd^2en + 4\,ad^2e)x + 60\,(10\,be}{1200}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/1200*(48*b*d^3*n + 240*a*d^3 + 300*(b*e^3*n + 2*a*e^3)*x^3 + 400*(b*d*e
^2*n + 3*a*d*e^2)*x^2 + 225*(b*d^2*e*n + 4*a*d^2*e)*x + 60*(10*b*e^3*x^3 +
 20*b*d*e^2*x^2 + 15*b*d^2*e*x + 4*b*d^3)*log(c) + 60*(10*b*e^3*n*x^3 + 20
*b*d*e^2*n*x^2 + 15*b*d^2*e*n*x + 4*b*d^3*n)*log(x))/x^5
```

3.28.6 Sympy [A] (verification not implemented)

Time = 0.56 (sec) , antiderivative size = 168, normalized size of antiderivative = 1.18

$$\begin{aligned}\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^6}\,dx = &-\frac{ad^3}{5x^5} - \frac{3ad^2e}{4x^4} - \frac{ade^2}{x^3} - \frac{ae^3}{2x^2} - \frac{bd^3n}{25x^5} \\ &- \frac{bd^3\log(cx^n)}{5x^5} - \frac{3bd^2en}{16x^4} - \frac{3bd^2e\log(cx^n)}{4x^4} \\ &- \frac{bde^2n}{3x^3} - \frac{bde^2\log(cx^n)}{x^3} - \frac{be^3n}{4x^2} - \frac{be^3\log(cx^n)}{2x^2}\end{aligned}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**6,x)
```

output
```
-a*d**3/(5*x**5) - 3*a*d**2*e/(4*x**4) - a*d*e**2/x**3 - a*e**3/(2*x**2) -
 b*d**3*n/(25*x**5) - b*d**3*log(c*x**n)/(5*x**5) - 3*b*d**2*e*n/(16*x**4)
 - 3*b*d**2*e*log(c*x**n)/(4*x**4) - b*d*e**2*n/(3*x**3) - b*d*e**2*log(c*
x**n)/x**3 - b*e**3*n/(4*x**2) - b*e**3*log(c*x**n)/(2*x**2)
```

3.28.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^6} dx = -\frac{be^3n}{4x^2} - \frac{be^3\log(cx^n)}{2x^2} - \frac{bde^2n}{3x^3} - \frac{ae^3}{2x^2} - \frac{bde^2\log(cx^n)}{x^3} - \frac{3bd^2en}{16x^4} - \frac{ade^2}{x^3} - \frac{3bd^2e\log(cx^n)}{4x^4} - \frac{bd^3n}{25x^5} - \frac{3ad^2e}{4x^4} - \frac{bd^3\log(cx^n)}{5x^5} - \frac{ad^3}{5x^5}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
-1/4*b*e^3*n/x^2 - 1/2*b*e^3*log(c*x^n)/x^2 - 1/3*b*d*e^2*n/x^3 - 1/2*a*e^
3/x^2 - b*d*e^2*log(c*x^n)/x^3 - 3/16*b*d^2*e*n/x^4 - a*d*e^2/x^3 - 3/4*b*
d^2*e*log(c*x^n)/x^4 - 1/25*b*d^3*n/x^5 - 3/4*a*d^2*e/x^4 - 1/5*b*d^3*log(
c*x^n)/x^5 - 1/5*a*d^3/x^5
```

3.28.8 Giac [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.15

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^6} dx = -\frac{(10\,be^3nx^3 + 20\,bde^2nx^2 + 15\,bd^2enx + 4\,bd^3n)\log(x)}{20\,x^5} - \frac{300\,be^3nx^3 + 600\,be^3x^3\log(c) + 400\,bde^2nx^2 + 600\,ae^3x^3 + 1200\,bde^2x^2\log(c) + 225\,bd^2enx + 1200\,ad}{1200\,x^5}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
-1/20*(10*b*e^3*n*x^3 + 20*b*d*e^2*n*x^2 + 15*b*d^2*e*n*x + 4*b*d^3*n)*log
(x)/x^5 - 1/1200*(300*b*e^3*n*x^3 + 600*b*e^3*x^3*log(c) + 400*b*d*e^2*n*x
^2 + 600*a*e^3*x^3 + 1200*b*d*e^2*x^2*log(c) + 225*b*d^2*e*n*x + 1200*a*d*
e^2*x^2 + 900*b*d^2*e*x*log(c) + 48*b*d^3*n + 900*a*d^2*e*x + 240*b*d^3*lo
g(c) + 240*a*d^3)/x^5
```

3.28.9 Mupad [B] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 120, normalized size of antiderivative = 0.85

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^6}\,dx = -\frac{x^3\,(10\,a\,e^3+5\,b\,e^3\,n)+x\left(15\,a\,d^2\,e+\frac{15\,b\,d^2\,e\,n}{4}\right)+4\,a\,d^3+x^2\left(20\,a\,d\,e^2+\frac{20\,b\,d\,e^2\,n}{3}\right)+\frac{4\,b\,d^3\,n}{5}}{20\,x^5} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d^3}{5}+\frac{3\,b\,d^2\,e\,x}{4}+b\,d\,e^2\,x^2+\frac{b\,e^3\,x^3}{2}\right)}{x^5}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^6,x)
```

output
```
- (x^3*(10*a*e^3 + 5*b*e^3*n) + x*(15*a*d^2*e + (15*b*d^2*e*n)/4) + 4*a*d^
3 + x^2*(20*a*d*e^2 + (20*b*d*e^2*n)/3) + (4*b*d^3*n)/5)/(20*x^5) - (log(c
*x^n)*((b*d^3)/5 + (b*e^3*x^3)/2 + (3*b*d^2*e*x)/4 + b*d*e^2*x^2))/x^5
```

3.29 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^7}\,dx$

3.29.1 Optimal result

Integrand size = 21, antiderivative size = 133

$$\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^7}\,dx = -\frac{bd^3n}{36x^6}-\frac{3bd^2en}{25x^5}-\frac{3bde^2n}{16x^4}-\frac{be^3n}{9x^3}-\frac{d^3(a+b\log(cx^n))}{6x^6}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{3de^2(a+b\log(cx^n))}{4x^4}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

output
```
-1/36*b*d^3*n/x^6-3/25*b*d^2*e*n/x^5-3/16*b*d*e^2*n/x^4-1/9*b*e^3*n/x^3-1/
6*d^3*(a+b*ln(c*x^n))/x^6-3/5*d^2*e*(a+b*ln(c*x^n))/x^5-3/4*d*e^2*(a+b*ln(
c*x^n))/x^4-1/3*e^3*(a+b*ln(c*x^n))/x^3
```

3.29.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.85

$$\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^7}\,dx = -\frac{60a(10d^3+36d^2ex+45de^2x^2+20e^3x^3)+bn(100d^3+432d^2ex+675de^2x^2+400e^3x^3)+60b(10d^3+3\cdots}{3600x^6}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^7,x]
```

output
```
-1/3600*(60*a*(10*d^3 + 36*d^2*e*x + 45*d*e^2*x^2 + 20*e^3*x^3) + b*n*(100
*d^3 + 432*d^2*e*x + 675*d*e^2*x^2 + 400*e^3*x^3) + 60*b*(10*d^3 + 36*d^2*
e*x + 45*d*e^2*x^2 + 20*e^3*x^3)*Log[c*x^n])/x^6
```

3.29.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 132, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^7} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{10d^3+36exd^2+45e^2x^2d+20e^3x^3}{60x^7}dx-\frac{d^3(a+b\log(cx^n))}{6x^6}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{3de^2(a+b\log(cx^n))}{4x^4}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{60}bn\int \frac{10d^3+36exd^2+45e^2x^2d+20e^3x^3}{x^7}dx-\frac{d^3(a+b\log(cx^n))}{6x^6}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{3de^2(a+b\log(cx^n))}{4x^4}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{60}bn\int \left(\frac{10d^3}{x^7}+\frac{36ed^2}{x^6}+\frac{45e^2d}{x^5}+\frac{20e^3}{x^4}\right)dx-\frac{d^3(a+b\log(cx^n))}{6x^6}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{3de^2(a+b\log(cx^n))}{4x^4}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{6x^6}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{3de^2(a+b\log(cx^n))}{4x^4}-\frac{e^3(a+b\log(cx^n))}{3x^3}+\frac{1}{60}bn\left(-\frac{5d^3}{3x^6}-\frac{36d^2e}{5x^5}-\frac{45de^2}{4x^4}-\frac{20e^3}{3x^3}\right)$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^7,x]
```

output
```
(b*n*((-5*d^3)/(3*x^6) - (36*d^2*e)/(5*x^5) - (45*d*e^2)/(4*x^4) - (20*e^3
)/(3*x^3)))/60 - (d^3*(a + b*Log[c*x^n]))/(6*x^6) - (3*d^2*e*(a + b*Log[c*
x^n]))/(5*x^5) - (3*d*e^2*(a + b*Log[c*x^n]))/(4*x^4) - (e^3*(a + b*Log[c*
x^n]))/(3*x^3)
```

3.29.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.29.4 Maple [A] (verified)

Time = 0.82 (sec) , antiderivative size = 134, normalized size of antiderivative = 1.01

method	result
parallelrisch	$-\frac{1200b\ln(c\,x^{n})e^{3}x^{3}+400b\,e^{3}n\,x^{3}+1200a\,e^{3}x^{3}+2700b\ln(c\,x^{n})d\,e^{2}x^{2}+675bd\,e^{2}n\,x^{2}+2700ad\,e^{2}x^{2}+2160b\ln(c\,x^{n})d^{2}ex+432b}{3600x^{6}}$
risch	$-\frac{b(20e^{3}x^{3}+45d\,e^{2}x^{2}+36d^{2}ex+10d^{3})\ln(x^{n})}{60x^{6}}-\frac{1200\ln(c)b\,e^{3}x^{3}-1350i\pi bd\,e^{2}x^{2}\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^{n})\,\mathrm{csgn}(ic\,x^{n})-1080i\pi b\,d^{2}}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^7,x,method=_RETURNVERBOSE)
```

output
```
-1/3600/x^6*(1200*b*ln(c*x^n)*e^3*x^3+400*b*e^3*n*x^3+1200*a*e^3*x^3+2700*
b*ln(c*x^n)*d*e^2*x^2+675*b*d*e^2*n*x^2+2700*a*d*e^2*x^2+2160*b*ln(c*x^n)*
d^2*e*x+432*b*d^2*e*n*x+2160*a*d^2*e*x+600*b*ln(c*x^n)*d^3+100*b*d^3*n+600
*a*d^3)
```

3.29.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^7}\,dx =$$
$$-\frac{100\,bd^3n+600\,ad^3+400\,(be^3n+3\,ae^3)x^3+675\,(bde^2n+4\,ade^2)x^2+432\,(bd^2en+5\,ad^2e)x+60\,(20\,b}{36}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^7,x, algorithm="fricas")
```

output
```
-1/3600*(100*b*d^3*n + 600*a*d^3 + 400*(b*e^3*n + 3*a*e^3)*x^3 + 675*(b*d*
e^2*n + 4*a*d*e^2)*x^2 + 432*(b*d^2*e*n + 5*a*d^2*e)*x + 60*(20*b*e^3*x^3
+ 45*b*d*e^2*x^2 + 36*b*d^2*e*x + 10*b*d^3)*log(c) + 60*(20*b*e^3*n*x^3 +
45*b*d*e^2*n*x^2 + 36*b*d^2*e*n*x + 10*b*d^3*n)*log(x))/x^6
```

3.29.6 Sympy [A] (verification not implemented)

Time = 0.74 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.33

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^7}\,dx = -\frac{ad^3}{6x^6}-\frac{3ad^2e}{5x^5}-\frac{3ade^2}{4x^4}-\frac{ae^3}{3x^3}-\frac{bd^3n}{36x^6} - \frac{bd^3\log(cx^n)}{6x^6}-\frac{3bd^2en}{25x^5}-\frac{3bd^2e\log(cx^n)}{5x^5} - \frac{3bde^2n}{16x^4}-\frac{3bde^2\log(cx^n)}{4x^4}-\frac{be^3n}{9x^3}-\frac{be^3\log(cx^n)}{3x^3}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**7,x)
```

output
```
-a*d**3/(6*x**6) - 3*a*d**2*e/(5*x**5) - 3*a*d*e**2/(4*x**4) - a*e**3/(3*x
**3) - b*d**3*n/(36*x**6) - b*d**3*log(c*x**n)/(6*x**6) - 3*b*d**2*e*n/(25
*x**5) - 3*b*d**2*e*log(c*x**n)/(5*x**5) - 3*b*d*e**2*n/(16*x**4) - 3*b*d*
e**2*log(c*x**n)/(4*x**4) - b*e**3*n/(9*x**3) - b*e**3*log(c*x**n)/(3*x**3
)
```

3.29.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^7}\,dx = -\frac{be^3n}{9\,x^3} - \frac{be^3\log(cx^n)}{3\,x^3} - \frac{3\,bde^2n}{16\,x^4} - \frac{ae^3}{3\,x^3} - \frac{3\,bde^2\log(cx^n)}{4\,x^4} - \frac{3\,bd^2en}{25\,x^5} - \frac{3\,ade^2}{4\,x^4} - \frac{3\,bd^2e\log(cx^n)}{5\,x^5} - \frac{bd^3n}{36\,x^6} - \frac{3\,ad^2e}{5\,x^5} - \frac{bd^3\log(cx^n)}{6\,x^6} - \frac{ad^3}{6\,x^6}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^7,x, algorithm="maxima")
```

output
```
-1/9*b*e^3*n/x^3 - 1/3*b*e^3*log(c*x^n)/x^3 - 3/16*b*d*e^2*n/x^4 - 1/3*a*e
^3/x^3 - 3/4*b*d*e^2*log(c*x^n)/x^4 - 3/25*b*d^2*e*n/x^5 - 3/4*a*d*e^2/x^4
 - 3/5*b*d^2*e*log(c*x^n)/x^5 - 1/36*b*d^3*n/x^6 - 3/5*a*d^2*e/x^5 - 1/6*b
*d^3*log(c*x^n)/x^6 - 1/6*a*d^3/x^6
```

3.29.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^7}\,dx = -\frac{(20\,be^3nx^3 + 45\,bde^2nx^2 + 36\,bd^2enx + 10\,bd^3n)\log(x)}{60\,x^6} - \frac{400\,be^3nx^3 + 1200\,be^3x^3\log(c) + 675\,bde^2nx^2 + 1200\,ae^3x^3 + 2700\,bde^2x^2\log(c) + 432\,bd^2enx + 2700}{3600\,x^6}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^7,x, algorithm="giac")
```

output
```
-1/60*(20*b*e^3*n*x^3 + 45*b*d*e^2*n*x^2 + 36*b*d^2*e*n*x + 10*b*d^3*n)*lo
g(x)/x^6 - 1/3600*(400*b*e^3*n*x^3 + 1200*b*e^3*x^3*log(c) + 675*b*d*e^2*n
*x^2 + 1200*a*e^3*x^3 + 2700*b*d*e^2*x^2*log(c) + 432*b*d^2*e*n*x + 2700*a
*d*e^2*x^2 + 2160*b*d^2*e*x*log(c) + 100*b*d^3*n + 2160*a*d^2*e*x + 600*b*
d^3*log(c) + 600*a*d^3)/x^6
```

3.29.9 Mupad [B] (verification not implemented)

Time = 0.47 (sec) , antiderivative size = 121, normalized size of antiderivative = 0.91

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^7}\,dx = -\frac{x^3 \left(20\,a\,e^3+\frac{20\,b\,e^3\,n}{3}\right)+x\left(36\,a\,d^2\,e+\frac{36\,b\,d^2\,e\,n}{5}\right)+10\,a\,d^3+x^2\left(45\,a\,d\,e^2+\frac{45\,b\,d\,e^2\,n}{4}\right)+\frac{5\,b\,d^3\,n}{3}}{60\,x^6} - \frac{\ln(c\,x^n)\left(\frac{b\,d^3}{6}+\frac{3\,b\,d^2\,e\,x}{5}+\frac{3\,b\,d\,e^2\,x^2}{4}+\frac{b\,e^3\,x^3}{3}\right)}{x^6}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^7,x)
```

output
```
- (x^3*(20*a*e^3 + (20*b*e^3*n)/3) + x*(36*a*d^2*e + (36*b*d^2*e*n)/5) + 1
0*a*d^3 + x^2*(45*a*d*e^2 + (45*b*d*e^2*n)/4) + (5*b*d^3*n)/3)/(60*x^6) -
(log(c*x^n)*((b*d^3)/6 + (b*e^3*x^3)/3 + (3*b*d^2*e*x)/5 + (3*b*d*e^2*x^2)
/4))/x^6
```

3.30 $\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^8}\,dx$

3.30.1 Optimal result

Integrand size = 21, antiderivative size = 133

$$\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^3n}{49x^7}-\frac{bd^2en}{12x^6}-\frac{3bde^2n}{25x^5}-\frac{be^3n}{16x^4}-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{d^2e(a+b\log(cx^n))}{2x^6}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{4x^4}$$

output
```
-1/49*b*d^3*n/x^7-1/12*b*d^2*e*n/x^6-3/25*b*d*e^2*n/x^5-1/16*b*e^3*n/x^4-1
/7*d^3*(a+b*ln(c*x^n))/x^7-1/2*d^2*e*(a+b*ln(c*x^n))/x^6-3/5*d*e^2*(a+b*ln
(c*x^n))/x^5-1/4*e^3*(a+b*ln(c*x^n))/x^4
```

3.30.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.85

$$\int \frac{(d+ex)^3(a+b\log(cx^n))}{x^8}\,dx = -\frac{420a(20d^3+70d^2ex+84de^2x^2+35e^3x^3)+bn(1200d^3+4900d^2ex+7056de^2x^2+3675e^3x^3)+420b(2}{58800x^7}$$

input
```
Integrate[((d + e*x)^3*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
-1/58800*(420*a*(20*d^3 + 70*d^2*e*x + 84*d*e^2*x^2 + 35*e^3*x^3) + b*n*(1
200*d^3 + 4900*d^2*e*x + 7056*d*e^2*x^2 + 3675*e^3*x^3) + 420*b*(20*d^3 +
70*d^2*e*x + 84*d*e^2*x^2 + 35*e^3*x^3)*Log[c*x^n])/x^7
```

3.30.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 132, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^8} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{20d^3+70exd^2+84e^2x^2d+35e^3x^3}{140x^8}dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{d^2e(a+b\log(cx^n))}{2x^6}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{4x^4}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{140}bn\int \frac{20d^3+70exd^2+84e^2x^2d+35e^3x^3}{x^8}dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{d^2e(a+b\log(cx^n))}{2x^6}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{4x^4}$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{140}bn\int \left(\frac{20d^3}{x^8}+\frac{70ed^2}{x^7}+\frac{84e^2d}{x^6}+\frac{35e^3}{x^5}\right)dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{d^2e(a+b\log(cx^n))}{2x^6}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{4x^4}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{d^2e(a+b\log(cx^n))}{2x^6}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{4x^4}+\frac{1}{140}bn\left(-\frac{20d^3}{7x^7}-\frac{35d^2e}{3x^6}-\frac{84de^2}{5x^5}-\frac{35e^3}{4x^4}\right)$$

input
```
Int[((d + e*x)^3*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*((-20*d^3)/(7*x^7) - (35*d^2*e)/(3*x^6) - (84*d*e^2)/(5*x^5) - (35*e^
3)/(4*x^4)))/140 - (d^3*(a + b*Log[c*x^n]))/(7*x^7) - (d^2*e*(a + b*Log[c*
x^n]))/(2*x^6) - (3*d*e^2*(a + b*Log[c*x^n]))/(5*x^5) - (e^3*(a + b*Log[c*
x^n]))/(4*x^4)
```

3.30.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.30.4 Maple [A] (verified)

Time = 0.45 (sec) , antiderivative size = 134, normalized size of antiderivative = 1.01

method	result
parallelrisch	$-\frac{14700 b \ln \left(c \,x^{n}\right) e^{3} x^{3}+3675 b \,e^{3} n \,x^{3}+14700 a \,e^{3} x^{3}+35280 b \ln \left(c \,x^{n}\right) d \,e^{2} x^{2}+7056 b d \,e^{2} n \,x^{2}+35280 a d \,e^{2} x^{2}+29400 b \ln \left(c \,x^{n}\right) d^{2} e}{58800 x^{7}}$
risch	$-\frac{b \left(35 e^{3} x^{3}+84 d \,e^{2} x^{2}+70 d^{2} e x +20 d^{3}\right) \ln \left(x^{n}\right)}{140 x^{7}}-\frac{14700 \ln \left(c \right) b \,e^{3} x^{3}-17640 i \pi b d \,e^{2} x^{2} \operatorname{csgn}\left(i c \right) \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)-14700 i \pi}{}$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

output
```
-1/58800/x^7*(14700*b*ln(c*x^n)*e^3*x^3+3675*b*e^3*n*x^3+14700*a*e^3*x^3+3
5280*b*ln(c*x^n)*d*e^2*x^2+7056*b*d*e^2*n*x^2+35280*a*d*e^2*x^2+29400*b*ln
(c*x^n)*d^2*e*x+4900*b*d^2*e*n*x+29400*a*d^2*e*x+8400*b*ln(c*x^n)*d^3+1200
*b*d^3*n+8400*a*d^3)
```

3.30.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{1200\,bd^3n + 8400\,ad^3 + 3675\,(be^3n + 4\,ae^3)x^3 + 7056\,(bde^2n + 5\,ade^2)x^2 + 4900\,(bd^2en + 6\,ad^2e)x + 4}{}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

output
```
-1/58800*(1200*b*d^3*n + 8400*a*d^3 + 3675*(b*e^3*n + 4*a*e^3)*x^3 + 7056*
(b*d*e^2*n + 5*a*d*e^2)*x^2 + 4900*(b*d^2*e*n + 6*a*d^2*e)*x + 420*(35*b*e
^3*x^3 + 84*b*d*e^2*x^2 + 70*b*d^2*e*x + 20*b*d^3)*log(c) + 420*(35*b*e^3*
n*x^3 + 84*b*d*e^2*n*x^2 + 70*b*d^2*e*n*x + 20*b*d^3*n)*log(x))/x^7
```

3.30.6 Sympy [A] (verification not implemented)

Time = 0.95 (sec) , antiderivative size = 172, normalized size of antiderivative = 1.29

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{ad^3}{7x^7} - \frac{ad^2e}{2x^6} - \frac{3ade^2}{5x^5} - \frac{ae^3}{4x^4} - \frac{bd^3n}{49x^7} - \frac{bd^3\log(cx^n)}{7x^7} - \frac{bd^2en}{12x^6} - \frac{bd^2e\log(cx^n)}{2x^6} - \frac{3bde^2n}{25x^5} - \frac{3bde^2\log(cx^n)}{5x^5} - \frac{be^3n}{16x^4} - \frac{be^3\log(cx^n)}{4x^4}$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))/x**8,x)
```

output
```
-a*d**3/(7*x**7) - a*d**2*e/(2*x**6) - 3*a*d*e**2/(5*x**5) - a*e**3/(4*x**
4) - b*d**3*n/(49*x**7) - b*d**3*log(c*x**n)/(7*x**7) - b*d**2*e*n/(12*x**
6) - b*d**2*e*log(c*x**n)/(2*x**6) - 3*b*d*e**2*n/(25*x**5) - 3*b*d*e**2*l
og(c*x**n)/(5*x**5) - b*e**3*n/(16*x**4) - b*e**3*log(c*x**n)/(4*x**4)
```

3.30.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{be^3n}{16\,x^4} - \frac{be^3\log(cx^n)}{4\,x^4} - \frac{3\,bde^2n}{25\,x^5} - \frac{ae^3}{4\,x^4} - \frac{3\,bde^2\log(cx^n)}{5\,x^5} - \frac{bd^2en}{12\,x^6} - \frac{3\,ade^2}{5\,x^5} - \frac{bd^2e\log(cx^n)}{2\,x^6} - \frac{bd^3n}{49\,x^7} - \frac{ad^2e}{2\,x^6} - \frac{bd^3\log(cx^n)}{7\,x^7} - \frac{ad^3}{7\,x^7}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

output
```
-1/16*b*e^3*n/x^4 - 1/4*b*e^3*log(c*x^n)/x^4 - 3/25*b*d*e^2*n/x^5 - 1/4*a*
e^3/x^4 - 3/5*b*d*e^2*log(c*x^n)/x^5 - 1/12*b*d^2*e*n/x^6 - 3/5*a*d*e^2/x^
5 - 1/2*b*d^2*e*log(c*x^n)/x^6 - 1/49*b*d^3*n/x^7 - 1/2*a*d^2*e/x^6 - 1/7*
b*d^3*log(c*x^n)/x^7 - 1/7*a*d^3/x^7
```

3.30.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{(35\,be^3nx^3 + 84\,bde^2nx^2 + 70\,bd^2enx + 20\,bd^3n)\log(x)}{140\,x^7} - \frac{3675\,be^3nx^3 + 14700\,be^3x^3\log(c) + 7056\,bde^2nx^2 + 14700\,ae^3x^3 + 35280\,bde^2x^2\log(c) + 4900\,bd^2enx + \cdots}{58800\,x^7}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

output
```
-1/140*(35*b*e^3*n*x^3 + 84*b*d*e^2*n*x^2 + 70*b*d^2*e*n*x + 20*b*d^3*n)*l
og(x)/x^7 - 1/58800*(3675*b*e^3*n*x^3 + 14700*b*e^3*x^3*log(c) + 7056*b*d*
e^2*n*x^2 + 14700*a*e^3*x^3 + 35280*b*d*e^2*x^2*log(c) + 4900*b*d^2*e*n*x
+ 35280*a*d*e^2*x^2 + 29400*b*d^2*e*x*log(c) + 1200*b*d^3*n + 29400*a*d^2*
e*x + 8400*b*d^3*log(c) + 8400*a*d^3)/x^7
```

3.30.9 Mupad [B] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 121, normalized size of antiderivative = 0.91

$$\int \frac{(d+ex)^3 (a+b\log (cx^n))}{x^8}\,dx = -\frac{x^3\left(35\,a\,e^3+\frac{35\,b\,e^3\,n}{4}\right)+x\left(70\,a\,d^2\,e+\frac{35\,b\,d^2\,e\,n}{3}\right)+20\,a\,d^3+x^2\left(84\,a\,d\,e^2+\frac{84\,b\,d\,e^2\,n}{5}\right)+\frac{20\,b\,d^3\,n}{7}}{140\,x^7} - \frac{\ln\left(c\,x^n\right)\left(\frac{b\,d^3}{7}+\frac{b\,d^2\,e\,x}{2}+\frac{3\,b\,d\,e^2\,x^2}{5}+\frac{b\,e^3\,x^3}{4}\right)}{x^7}$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^3)/x^8,x)
```

output
```
- (x^3*(35*a*e^3 + (35*b*e^3*n)/4) + x*(70*a*d^2*e + (35*b*d^2*e*n)/3) + 2
0*a*d^3 + x^2*(84*a*d*e^2 + (84*b*d*e^2*n)/5) + (20*b*d^3*n)/7)/(140*x^7)
- (log(c*x^n)*((b*d^3)/7 + (b*e^3*x^3)/4 + (b*d^2*e*x)/2 + (3*b*d*e^2*x^2)
/5))/x^7
```

3.31 $\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx$

3.31.1 Optimal result

Integrand size = 21, antiderivative size = 148

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx=\frac{ad^2x}{e^3}-\frac{bd^2nx}{e^3}+\frac{bdnx^2}{4e^2}-\frac{bnx^3}{9e}+\frac{bd^2x\log(cx^n)}{e^3}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^3(a+b\log(cx^n))}{3e}-\frac{d^3(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^4}-\frac{bd^3n\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}$$

output
```
a*d^2*x/e^3-b*d^2*n*x/e^3+1/4*b*d*n*x^2/e^2-1/9*b*n*x^3/e+b*d^2*x*ln(c*x^n
)/e^3-1/2*d*x^2*(a+b*ln(c*x^n))/e^2+1/3*x^3*(a+b*ln(c*x^n))/e-d^3*(a+b*ln(
c*x^n))*ln(1+e*x/d)/e^4-b*d^3*n*polylog(2,-e*x/d)/e^4
```

3.31.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 142, normalized size of antiderivative = 0.96

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx=\frac{36ad^2ex-36bd^2enx-18ade^2x^2+9bde^2nx^2+12ae^3x^3-4be^3nx^3-36ad^3\log\left(1+\frac{ex}{d}\right)+6b\log(cx^n)\left(ex\right.}{36e^4}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
(36*a*d^2*e*x - 36*b*d^2*e*n*x - 18*a*d*e^2*x^2 + 9*b*d*e^2*n*x^2 + 12*a*e
^3*x^3 - 4*b*e^3*n*x^3 - 36*a*d^3*Log[1 + (e*x)/d] + 6*b*Log[c*x^n]*(e*x*(
6*d^2 - 3*d*e*x + 2*e^2*x^2) - 6*d^3*Log[1 + (e*x)/d]) - 36*b*d^3*n*PolyLo
g[2, -((e*x)/d)])/(36*e^4)
```

3.31.3 Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(-\frac{d^3(a+b\log(cx^n))}{e^3(d+ex)}+\frac{d^2(a+b\log(cx^n))}{e^3}-\frac{dx(a+b\log(cx^n))}{e^2}+\frac{x^2(a+b\log(cx^n))}{e}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^4}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^3(a+b\log(cx^n))}{3e}+\frac{ad^2x}{e^3}+\frac{bd^2x\log(cx^n)}{e^3}-\frac{bd^3n\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}-\frac{bd^2nx}{e^3}+\frac{bdnx^2}{4e^2}-\frac{bnx^3}{9e}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
(a*d^2*x)/e^3 - (b*d^2*n*x)/e^3 + (b*d*n*x^2)/(4*e^2) - (b*n*x^3)/(9*e) +
(b*d^2*x*Log[c*x^n])/e^3 - (d*x^2*(a + b*Log[c*x^n]))/(2*e^2) + (x^3*(a +
b*Log[c*x^n]))/(3*e) - (d^3*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e^4 - (b*
d^3*n*PolyLog[2, -((e*x)/d)])/e^4
```

3.31.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.31.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.67 (sec) , antiderivative size = 272, normalized size of antiderivative = 1.84

method	result
risch	$\frac{b\ln(x^n)x^3}{3e} - \frac{b\ln(x^n)d\,x^2}{2e^2} + \frac{b\ln(x^n)x\,d^2}{e^3} - \frac{b\ln(x^n)d^3\ln(ex+d)}{e^4} - \frac{bn\,x^3}{9e} + \frac{bdn\,x^2}{4e^2} - \frac{b\,d^2nx}{e^3} - \frac{49bn\,d^3}{36e^4} + \frac{bn\,d^3\ln(ex+d}{e^4}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
1/3*b*ln(x^n)/e*x^3-1/2*b*ln(x^n)/e^2*d*x^2+b*ln(x^n)/e^3*x*d^2-b*ln(x^n)*
d^3/e^4*ln(e*x+d)-1/9*b*n*x^3/e+1/4*b*d*n*x^2/e^2-b*d^2*n*x/e^3-49/36*b*n*
d^3/e^4+b*n*d^3/e^4*ln(e*x+d)*ln(-e*x/d)+b*n*d^3/e^4*dilog(-e*x/d)+(-1/2*I
*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^
n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*l
n(c)+a)*(1/e^3*(1/3*e^2*x^3-1/2*d*e*x^2+d^2*x)-d^3/e^4*ln(e*x+d))
```

3.31.5 Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{ex+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e*x + d), x)
```

3.31.6 Sympy [A] (verification not implemented)

Time = 16.24 (sec) , antiderivative size = 267, normalized size of antiderivative = 1.80

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx = -\frac{ad^3\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^3} + \frac{ad^2x}{e^3} - \frac{adx^2}{2e^2} + \frac{ax^3}{3e} + \frac{bd^3n\left(\begin{cases}\frac{x}{d} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{e^3} - \frac{bd^3\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3} - \frac{bd^2nx}{e^3} + \frac{bd^2x\log(cx^n)}{e^3} + \frac{bdnx^2}{4e^2} - \frac{bdx^2\log(cx^n)}{2e^2} - \frac{bnx^3}{9e} + \frac{bx^3\log(cx^n)}{3e}$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d),x)
```

output
```
-a*d**3*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**3 + a*d**2*x
/e**3 - a*d*x**2/(2*e**2) + a*x**3/(3*e) + b*d**3*n*Piecewise((x/d, Eq(e,
0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs
(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1)
, (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-
meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((),
 (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/
e**3 - b*d**3*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**
n)/e**3 - b*d**2*n*x/e**3 + b*d**2*x*log(c*x**n)/e**3 + b*d*n*x**2/(4*e**2
) - b*d*x**2*log(c*x**n)/(2*e**2) - b*n*x**3/(9*e) + b*x**3*log(c*x**n)/(3
*e)
```

3.31.7 Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{ex+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

output
```
-1/6*a*(6*d^3*log(e*x + d)/e^4 - (2*e^2*x^3 - 3*d*e*x^2 + 6*d^2*x)/e^3) +
b*integrate((x^3*log(c) + x^3*log(x^n))/(e*x + d), x)
```

3.31.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{ex+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x + d), x)
```

3.31.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{d+e\,x}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x), x)
```

3.32 $\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx$

3.32.1 Optimal result

Integrand size = 21, antiderivative size = 107

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx = -\frac{adx}{e^2}+\frac{bdnx}{e^2}-\frac{bnx^2}{4e}-\frac{bdx\log(cx^n)}{e^2}+\frac{x^2(a+b\log(cx^n))}{2e} + \frac{d^2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3}+\frac{bd^2n\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}$$

output
```
-a*d*x/e^2+b*d*n*x/e^2-1/4*b*n*x^2/e-b*d*x*ln(c*x^n)/e^2+1/2*x^2*(a+b*ln(c
*x^n))/e+d^2*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^3+b*d^2*n*polylog(2,-e*x/d)/e^3
```

3.32.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 105, normalized size of antiderivative = 0.98

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx = \frac{-4adex+4bdenx+2ae^2x^2-be^2nx^2+4ad^2\log\left(1+\frac{ex}{d}\right)+2b\log(cx^n)\left(ex(-2d+ex)+2d^2\log\left(1+\frac{ex}{d}\right)\right.}{4e^3}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
(-4*a*d*e*x + 4*b*d*e*n*x + 2*a*e^2*x^2 - b*e^2*n*x^2 + 4*a*d^2*Log[1 + (e
*x)/d] + 2*b*Log[c*x^n]*(e*x*(-2*d + e*x) + 2*d^2*Log[1 + (e*x)/d]) + 4*b*
d^2*n*PolyLog[2, -((e*x)/d)])/(4*e^3)
```

3.32.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 107, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx$$

$$\Big\downarrow \ 2793$$

$$\int \left(\frac{d^2(a+b\log(cx^n))}{e^2(d+ex)}-\frac{d(a+b\log(cx^n))}{e^2}+\frac{x(a+b\log(cx^n))}{e}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{d^2\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^3}+\frac{x^2(a+b\log(cx^n))}{2e}-\frac{adx}{e^2}-\frac{bdx\log(cx^n)}{e^2}+\frac{bd^2n\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{bdnx}{e^2}-\frac{bnx^2}{4e}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
-((a*d*x)/e^2) + (b*d*n*x)/e^2 - (b*n*x^2)/(4*e) - (b*d*x*Log[c*x^n])/e^2
+ (x^2*(a + b*Log[c*x^n]))/(2*e) + (d^2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d
])/e^3 + (b*d^2*n*PolyLog[2, -((e*x)/d)])/e^3
```

3.32.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.32.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.40 (sec) , antiderivative size = 233, normalized size of antiderivative = 2.18

method	result
risch	$\frac{b\ln(x^n)x^2}{2e} - \frac{b\ln(x^n)dx}{e^2} + \frac{b\ln(x^n)d^2\ln(ex+d)}{e^3} - \frac{bn\,d^2\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^3} - \frac{bn\,d^2\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e^3} - \frac{bn\,x^2}{4e} + \frac{bdnx}{e^2} + \frac{5bn\,d^2}{4e^3}$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e*x^2-b*ln(x^n)/e^2*d*x+b*ln(x^n)*d^2/e^3*ln(e*x+d)-b*n*d^2/
e^3*ln(e*x+d)*ln(-e*x/d)-b*n*d^2/e^3*dilog(-e*x/d)-1/4*b*n*x^2/e+b*d*n*x/e
^2+5/4*b*n*d^2/e^3+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*
b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*
I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/e^2*(1/2*e*x^2-d*x)+d^2/e^3*ln(e*x+d)
)
```

3.32.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{ex+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e*x + d), x)
```

3.32.6 Sympy [A] (verification not implemented)

Time = 12.90 (sec) , antiderivative size = 218, normalized size of antiderivative = 2.04

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx = \frac{ad^2\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^2} - \frac{adx}{e^2} + \frac{ax^2}{2e} - \frac{bd^2n\left(\begin{cases}\frac{x}{d} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{e^2} + \frac{bd^2\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2} + \frac{bdnx}{e^2} - \frac{bdx\log(cx^n)}{e^2} - \frac{bnx^2}{4e} + \frac{bx^2\log(cx^n)}{2e}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d),x)
```

output
```
a*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**2 - a*d*x/e**
2 + a*x**2/(2*e) - b*d**2*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylo
g(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x
) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - po
lylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((
0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - po
lylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/e**2 + b*d**2*Piecewise(
(x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**2 + b*d*n*x/e**2 -
 b*d*x*log(c*x**n)/e**2 - b*n*x**2/(4*e) + b*x**2*log(c*x**n)/(2*e)
```

3.32.7 Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{ex+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

output
```
1/2*a*(2*d^2*log(e*x + d)/e^3 + (e*x^2 - 2*d*x)/e^2) + b*integrate((x^2*lo
g(c) + x^2*log(x^n))/(e*x + d), x)
```

3.32.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{ex+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x + d), x)
```

3.32.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{d+e\,x}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x), x)
```

3.33 $\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx$

3.33.1 Optimal result

Integrand size = 19, antiderivative size = 69

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = \frac{ax}{e}-\frac{bnx}{e}+\frac{bx\log(cx^n)}{e}-\frac{d(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2}-\frac{bdn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}$$

output
```
a*x/e-b*n*x/e+b*x*ln(c*x^n)/e-d*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^2-b*d*n*poly
log(2,-e*x/d)/e^2
```

3.33.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 66, normalized size of antiderivative = 0.96

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = \frac{aex-benx-ad\log\left(1+\frac{ex}{d}\right)+b\log(cx^n)\left(ex-d\log\left(1+\frac{ex}{d}\right)\right)-bdn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
(a*e*x - b*e*n*x - a*d*Log[1 + (e*x)/d] + b*Log[c*x^n]*(e*x - d*Log[1 + (e
*x)/d]) - b*d*n*PolyLog[2, -((e*x)/d)])/e^2
```

3.33.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx$$

$$\Big\downarrow \ 2793$$

$$\int \left(\frac{a+b\log(cx^n)}{e}-\frac{d(a+b\log(cx^n))}{e(d+ex)}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-\frac{d\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^2}+\frac{ax}{e}+\frac{bx\log(cx^n)}{e}-\frac{bdn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{bnx}{e}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
(a*x)/e - (b*n*x)/e + (b*x*Log[c*x^n])/e - (d*(a + b*Log[c*x^n])*Log[1 + (
e*x)/d])/e^2 - (b*d*n*PolyLog[2, -((e*x)/d)])/e^2
```

3.33.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.33.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.39 (sec) , antiderivative size = 188, normalized size of antiderivative = 2.72

method	result
risch	$\frac{b\ln(x^n)x}{e} - \frac{b\ln(x^n)d\ln(ex+d)}{e^2} - \frac{bnx}{e} - \frac{bnd}{e^2} + \frac{bnd\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^2} + \frac{bnd\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e^2} + \Big(-\frac{ib\pi\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\ \mathrm{csg}}{2}$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e*x-b*ln(x^n)*d/e^2*ln(e*x+d)-b*n*x/e-b*n*d/e^2+b*n*d/e^2*ln(e*x
+d)*ln(-e*x/d)+b*n*d/e^2*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*
csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(x/e-d/e^2*ln(e*x+d)
)
```

3.33.5 Fricas [F]

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x^n) + a*x)/(e*x + d), x)
```

3.33.6 Sympy [A] (verification not implemented)

Time = 8.06 (sec) , antiderivative size = 163, normalized size of antiderivative = 2.36

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = -\frac{ad\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e} + \frac{ax}{e} + \frac{bdn\left(\begin{cases}\frac{x}{d} & \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \end{cases}\right)}{e} - \frac{bd\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e} - \frac{bnx}{e} + \frac{bx\log(cx^n)}{e}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d),x)
```

output
```
-a*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e + a*x/e + b*d*n*
Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d),
 (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar
(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)
/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meij
erg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)
/d), True))/e, True))/e - b*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e,
True))*log(c*x**n)/e - b*n*x/e + b*x*log(c*x**n)/e
```

3.33.7 Maxima [F]

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

output
```
a*(x/e - d*log(e*x + d)/e^2) + b*integrate((x*log(c) + x*log(x^n))/(e*x +
d), x)
```

3.33.8 Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x + d), x)
```

3.33.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{d+ex}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{d+e\,x}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x), x)
```

3.34 $\int \frac{a+b\log(cx^n)}{d+ex}\,dx$

3.34.1 Optimal result

Integrand size = 18, antiderivative size = 39

$$\int \frac{a+b\log(cx^n)}{d+ex}\,dx=\frac{(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e}+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}$$

output
```
(a+b*ln(c*x^n))*ln(1+e*x/d)/e+b*n*polylog(2,-e*x/d)/e
```

3.34.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 37, normalized size of antiderivative = 0.95

$$\int \frac{a+b\log(cx^n)}{d+ex}\,dx=\frac{(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)+bn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x),x]
```

output
```
((a + b*Log[c*x^n])*Log[1 + (e*x)/d] + b*n*PolyLog[2, -((e*x)/d)])/e
```

3.34.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{d+ex}\,dx$$

$$\Big\downarrow \text{2754}$$

$$\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x),x]
```

output
```
((a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e
```

3.34.3.1 Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.34.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.40 (sec) , antiderivative size = 151, normalized size of antiderivative = 3.87

method	result
risch	$\frac{b\ln(x^n)\ln(ex+d)}{e} - \frac{bn\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e} - \frac{bn\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e} + \frac{\left(-\frac{ib\pi\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)}{2} + \frac{ib\pi\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2}{2} + ib\pi \right.}{e}$

input
```
int((a+b*ln(c*x^n))/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)*ln(e*x+d)/e-b/e*n*ln(e*x+d)*ln(-e*x/d)-b/e*n*dilog(-e*x/d)+(-1/2
*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*
x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b
*ln(c)+a)*ln(e*x+d)/e
```

3.34.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{d+ex}\,dx = \int \frac{b\log(cx^n)+a}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x + d), x)
```

3.34.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{d+ex}\,dx = \int \frac{a+b\log(cx^n)}{d+ex}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x), x)
```

3.34.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{d+ex}\,dx = \int \frac{b\log(cx^n)+a}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

output
```
b*integrate((log(c) + log(x^n))/(e*x + d), x) + a*log(e*x + d)/e
```

3.34.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{d+ex}\,dx = \int \frac{b\log(cx^n)+a}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x + d), x)
```

3.34.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{d+ex}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{d+e\,x}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x), x)
```

3.35 $\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx$

3.35.1 Optimal result

Integrand size = 21, antiderivative size = 44

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx=-\frac{\log\left(1+\frac{d}{ex}\right)\left(a+b\log\left(cx^n\right)\right)}{d}+\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}$$

output
```
-ln(1+d/e/x)*(a+b*ln(c*x^n))/d+b*n*polylog(2,-d/e/x)/d
```

3.35.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.43

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx=\frac{\left(a+b\log\left(cx^n\right)\right)\left(a+b\log\left(cx^n\right)-2bn\log\left(1+\frac{ex}{d}\right)\right)}{2bdn}-\frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)),x]
```

output
```
((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1 + (e*x)/d]))/(2*b*d*n)
 - (b*n*PolyLog[2, -((e*x)/d)])/d
```

3.35.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}dx$$

$$\Big\downarrow \text{2779}$$

$$\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x)),x]
```

output
```
-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/
d
```

3.35.3.1 Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.35.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.75 (sec) , antiderivative size = 181, normalized size of antiderivative = 4.11

method	result
risch	$-\frac{b\ln(x^n)\ln(ex+d)}{d}+\frac{b\ln(x^n)\ln(x)}{d}-\frac{bn\ln(x)^2}{2d}+\frac{bn\ln(ex+d)\ln(-\frac{ex}{d})}{d}+\frac{bn\,\mathrm{dilog}(-\frac{ex}{d})}{d}+\Big(-\frac{ib\pi\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csg}}{2}$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d*ln(e*x+d)+b*ln(x^n)/d*ln(x)-1/2*b*n/d*ln(x)^2+b*n/d*ln(e*x+d)
*ln(-e*x/d)+b*n/d*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*
c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-1/d*ln(e*x+d)+1/d*ln(x))
```

3.35.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^2 + d*x), x)
```

3.35.6 Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 5.53 (sec) , antiderivative size = 175, normalized size of antiderivative = 3.98

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx = -\frac{2ae\left(\begin{cases}\frac{1}{2e}+\frac{x}{d} & \text{for } e=0\\ -\frac{\log(-2ex)}{2e} & \text{otherwise}\end{cases}\right)}{d} - \frac{2ae\left(\begin{cases}\frac{1}{2e}+\frac{x}{d} & \text{for } e=0\\ \frac{\log(2d+2ex)}{2e} & \text{otherwise}\end{cases}\right)}{d}$$
$$+bn\left(\begin{cases}-\frac{1}{ex}\\ \frac{\begin{cases}\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(e)\log(x)+\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)+\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(e)+\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)$$
$$-b\left(\begin{cases}\frac{1}{ex} & \text{for } d=0\\ \frac{\log\left(\frac{d}{x}+e\right)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d),x)
```

output
```
-2*a*e*Piecewise((1/(2*e) + x/d, Eq(e, 0)), (-log(-2*e*x)/(2*e), True))/d
- 2*a*e*Piecewise((1/(2*e) + x/d, Eq(e, 0)), (log(2*d + 2*e*x)/(2*e), True
))/d + b*n*Piecewise((-1/(e*x), Eq(d, 0)), (Piecewise((polylog(2, d*exp_po
lar(I*pi)/(e*x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) + polylog
(2, d*exp_polar(I*pi)/(e*x)), Abs(x) < 1), (-log(e)*log(1/x) + polylog(2,
d*exp_polar(I*pi)/(e*x)), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0),
()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) + polylog(2
, d*exp_polar(I*pi)/(e*x)), True))/d, True)) - b*Piecewise((1/(e*x), Eq(d,
 0)), (log(d/x + e)/d, True))*log(c*x**n)
```

3.35.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d),x, algorithm="maxima")
```

output
```
-a*(log(e*x + d)/d - log(x)/d) + b*integrate((log(c) + log(x^n))/(e*x^2 +
d*x), x)
```

3.35.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)*x), x)
```

3.35.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)), x)
```

3.36 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)}\,dx$

3.36.1 Optimal result

Integrand size = 21, antiderivative size = 74

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)}\,dx = -\frac{bn}{dx}-\frac{a+b\log(cx^n)}{dx}+\frac{e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^2}-\frac{ben\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2}$$

output
```
-b*n/d/x+(-a-b*ln(c*x^n))/d/x+e*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^2-b*e*n*poly
log(2,-d/e/x)/d^2
```

3.36.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 88, normalized size of antiderivative = 1.19

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)}\,dx = -\frac{\frac{2bdn}{x}+\frac{2d(a+b\log(cx^n))}{x}+\frac{e(a+b\log(cx^n))^2}{bn}-2e(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)-2ben\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{2d^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)),x]
```

output
```
-1/2*((2*b*d*n)/x + (2*d*(a + b*Log[c*x^n]))/x + (e*(a + b*Log[c*x^n])^2)/
(b*n) - 2*e*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 2*b*e*n*PolyLog[2, -((e*
x)/d)])/d^2
```

3.36.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 78, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)),x]
```

output
```
(-((b*n)/x) - (a + b*Log[c*x^n])/x)/d - (e*(-((Log[1 + d/(e*x)]*(a + b*Log
[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/d))/d
```

3.36.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.36.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.76 (sec) , antiderivative size = 221, normalized size of antiderivative = 2.99

method	result
risch	$\frac{b\ln(x^n)e\ln(ex+d)}{d^2}-\frac{b\ln(x^n)}{dx}-\frac{b\ln(x^n)e\ln(x)}{d^2}-\frac{bne\ln(ex+d)\ln(-\frac{ex}{d})}{d^2}-\frac{bne\,\mathrm{dilog}(-\frac{ex}{d})}{d^2}-\frac{bn}{dx}+\frac{bne\ln(x)^2}{2d^2}+\Big(-\frac{ib}{}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)*e/d^2*ln(e*x+d)-b*ln(x^n)/d/x-b*ln(x^n)*e/d^2*ln(x)-b*n*e/d^2*ln
(e*x+d)*ln(-e*x/d)-b*n*e/d^2*dilog(-e*x/d)-b*n/d/x+1/2*b*n*e/d^2*ln(x)^2+(
-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(
I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)
^3+b*ln(c)+a)*(e/d^2*ln(e*x+d)-1/d/x-e/d^2*ln(x))
```

3.36.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^2(d+ex)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{(ex+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^3 + d*x^2), x)
```

3.36.6 Sympy [A] (verification not implemented)

Time = 32.45 (sec) , antiderivative size = 216, normalized size of antiderivative = 2.92

$$\int \frac{a+b\log\left(cx^n\right)}{x^2(d+ex)}\,dx=-\frac{a}{dx}+\frac{ae^2\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^2}-\frac{ae\log(x)}{d^2}-\frac{bn}{dx}-\frac{b\log\left(cx^n\right)}{dx}$$
$$-\frac{be^2n\left(\begin{cases}\frac{x}{d} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{d^2}$$
$$+\frac{be^2\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log\left(cx^n\right)}{d^2}+\frac{ben\log(x)^2}{2d^2}-\frac{be\log(x)\log\left(cx^n\right)}{d^2}$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d),x)
```

output
```
-a/(d*x) + a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d**2
- a*e*log(x)/d**2 - b*n/(d*x) - b*log(c*x**n)/(d*x) - b*e**2*n*Piecewise((
x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) <
1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d),
Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(
x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1)
, ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))
/e, True))/d**2 + b*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True)
)*log(c*x**n)/d**2 + b*e*n*log(x)**2/(2*d**2) - b*e*log(x)*log(c*x**n)/d**
2
```

3.36.7 Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex)}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d),x, algorithm="maxima")
```

output
```
a*(e*log(e*x + d)/d^2 - e*log(x)/d^2 - 1/(d*x)) + b*integrate((log(c) + lo
g(x^n))/(e*x^3 + d*x^2), x)
```

3.36.8 Giac [F]

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex)}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)*x^2), x)
```

3.36.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)), x)
```

3.37 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx$

3.37.1 Optimal result

Integrand size = 21, antiderivative size = 110

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx = -\frac{bn}{4dx^2}+\frac{ben}{d^2x}-\frac{a+b\log(cx^n)}{2dx^2}+\frac{e(a+b\log(cx^n))}{d^2x} - \frac{e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^3}+\frac{be^2n\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}$$

output
```
-1/4*b*n/d/x^2+b*e*n/d^2/x+1/2*(-a-b*ln(c*x^n))/d/x^2+e*(a+b*ln(c*x^n))/d^
2/x-e^2*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^3+b*e^2*n*polylog(2,-d/e/x)/d^3
```

3.37.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.13

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx = -\frac{\frac{bd^2n}{x^2}-\frac{4bden}{x}+\frac{2d^2(a+b\log(cx^n))}{x^2}-\frac{4de(a+b\log(cx^n))}{x}-\frac{2e^2(a+b\log(cx^n))^2}{bn}+4e^2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)+4b}{4d^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)),x]
```

output
```
-1/4*((b*d^2*n)/x^2 - (4*b*d*e*n)/x + (2*d^2*(a + b*Log[c*x^n]))/x^2 - (4*
d*e*(a + b*Log[c*x^n]))/x - (2*e^2*(a + b*Log[c*x^n])^2)/(b*n) + 4*e^2*(a
+ b*Log[c*x^n])*Log[1 + (e*x)/d] + 4*b*e^2*n*PolyLog[2, -((e*x)/d)])/d^3
```

3.37.3 Rubi [A] (verified)

Time = 0.57 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.05, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286, Rules used = {2780, 2741, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^3}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^2(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^2(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2780}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{\int \frac{a+b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}\right)}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)),x]
```

output
```
(-1/4*(b*n)/x^2 - (a + b*Log[c*x^n])/(2*x^2))/d - (e*((-((b*n)/x) - (a + b
*Log[c*x^n])/x)/d - (e*(-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d) + (b*n*
PolyLog[2, -(d/(e*x))])/d))/d))/d
```

3.37.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.37.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.45 (sec) , antiderivative size = 264, normalized size of antiderivative = 2.40

method	result
risch	$-\frac{b\ln(x^n)e^2\ln(ex+d)}{d^3}-\frac{b\ln(x^n)}{2d\,x^2}+\frac{b\ln(x^n)e^2\ln(x)}{d^3}+\frac{b\ln(x^n)e}{d^2x}+\frac{ben}{d^2x}-\frac{bn}{4d\,x^2}-\frac{bn\,e^2\ln(x)^2}{2d^3}+\frac{bn\,e^2\ln(ex+d)\ln(-\frac{ex}{d}}{d^3}$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)*e^2/d^3*ln(e*x+d)-1/2*b*ln(x^n)/d/x^2+b*ln(x^n)*e^2/d^3*ln(x)+b
*ln(x^n)*e/d^2/x+b*e*n/d^2/x-1/4*b*n/d/x^2-1/2*b*n*e^2/d^3*ln(x)^2+b*n*e^2
/d^3*ln(e*x+d)*ln(-e*x/d)+b*n*e^2/d^3*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi
*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-e^2/d
^3*ln(e*x+d)-1/2/d/x^2+e^2/d^3*ln(x)+e/d^2/x)
```

3.37.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^4 + d*x^3), x)
```

3.37.6 Sympy [A] (verification not implemented)

Time = 35.16 (sec) , antiderivative size = 265, normalized size of antiderivative = 2.41

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx = -\frac{a}{2dx^2} + \frac{ae}{d^2x} - \frac{ae^3\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^3} + \frac{ae^2\log(x)}{d^3} - \frac{bn}{4dx^2} - \frac{b\log(cx^n)}{2dx^2} + \frac{ben}{d^2x} + \frac{be\log(cx^n)}{d^2x} + \frac{be^3n\left(\begin{cases}\frac{x}{d} & \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e} & \end{cases}\right)}{d^3} - \frac{be^3\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3} - \frac{be^2n\log(x)^2}{2d^3} + \frac{be^2\log(x)\log(cx^n)}{d^3}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x+d),x)
```

output
```
-a/(2*d*x**2) + a*e/(d**2*x) - a*e**3*Piecewise((x/d, Eq(e, 0)), (log(d +
e*x)/e, True))/d**3 + a*e**2*log(x)/d**3 - b*n/(4*d*x**2) - b*log(c*x**n)/
(2*d*x**2) + b*e*n/(d**2*x) + b*e*log(c*x**n)/(d**2*x) + b*e**3*n*Piecewis
e((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x)
 < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d
), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/A
bs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1,
 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), Tru
e))/e, True))/d**3 - b*e**3*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, Tr
ue))*log(c*x**n)/d**3 - b*e**2*n*log(x)**2/(2*d**3) + b*e**2*log(x)*log(c*
x**n)/d**3
```

3.37.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d),x, algorithm="maxima")
```

output
```
-1/2*a*(2*e^2*log(e*x + d)/d^3 - 2*e^2*log(x)/d^3 - (2*e*x - d)/(d^2*x^2))
 + b*integrate((log(c) + log(x^n))/(e*x^4 + d*x^3), x)
```

3.37.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)*x^3), x)
```

3.37.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^3\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)), x)
```

3.38 $\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx$

3.38.1 Optimal result

Integrand size = 21, antiderivative size = 150

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx = &-\frac{bn}{9dx^3}+\frac{ben}{4d^2x^2}-\frac{be^2n}{d^3x}-\frac{a+b\log(cx^n)}{3dx^3}\\ &+\frac{e(a+b\log(cx^n))}{2d^2x^2}-\frac{e^2(a+b\log(cx^n))}{d^3x}\\ &+\frac{e^3\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4}-\frac{be^3n\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}\end{aligned}$$

output
```
-1/9*b*n/d/x^3+1/4*b*e*n/d^2/x^2-b*e^2*n/d^3/x+1/3*(-a-b*ln(c*x^n))/d/x^3+
1/2*e*(a+b*ln(c*x^n))/d^2/x^2-e^2*(a+b*ln(c*x^n))/d^3/x+e^3*ln(1+d/e/x)*(a
+b*ln(c*x^n))/d^4-b*e^3*n*polylog(2,-d/e/x)/d^4
```

3.38.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 159, normalized size of antiderivative = 1.06

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx$$
$$=\frac{-\frac{4bd^3n}{x^3}+\frac{9bd^2en}{x^2}-\frac{36bde^2n}{x}-\frac{12d^3(a+b\log(cx^n))}{x^3}+\frac{18d^2e(a+b\log(cx^n))}{x^2}-\frac{36de^2(a+b\log(cx^n))}{x}-\frac{18e^3(a+b\log(cx^n))^2}{bn}+36e^3}{36d^4}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x)),x]
```

output
```
((-4*b*d^3*n)/x^3 + (9*b*d^2*e*n)/x^2 - (36*b*d*e^2*n)/x - (12*d^3*(a + b*
Log[c*x^n]))/x^3 + (18*d^2*e*(a + b*Log[c*x^n]))/x^2 - (36*d*e^2*(a + b*Lo
g[c*x^n]))/x - (18*e^3*(a + b*Log[c*x^n])^2)/(b*n) + 36*e^3*(a + b*Log[c*x
^n])*Log[1 + (e*x)/d] + 36*b*e^3*n*PolyLog[2, -((e*x)/d)])/(36*d^4)
```

3.38.3 Rubi [A] (verified)

Time = 0.77 (sec) , antiderivative size = 154, normalized size of antiderivative = 1.03, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.381$, Rules used = {2780, 2741, 2780, 2741, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^4}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^3(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^3(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2780}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{\int \frac{a+b\log(cx^n)}{x^3}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^2(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^2(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2780}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{\int \frac{a+b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\int\frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{bn\int\frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}\right)}{d}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}\right)}{d}\right)}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*(d + e*x)),x]
```

output
```
(-1/9*(b*n)/x^3 - (a + b*Log[c*x^n])/(3*x^3))/d - (e*((-1/4*(b*n)/x^2 - (a
 + b*Log[c*x^n])/(2*x^2))/d - (e*((-((b*n)/x) - (a + b*Log[c*x^n])/x)/d -
(e*(-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x)
)])/d))/d))/d))/d
```

3.38. $\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx$

3.38.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.38.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.47 (sec) , antiderivative size = 309, normalized size of antiderivative = 2.06

method	result
risch	$\frac{b\ln(x^n)e^3\ln(ex+d)}{d^4} - \frac{b\ln(x^n)}{3d\,x^3} - \frac{b\ln(x^n)e^2}{d^3x} + \frac{b\ln(x^n)e}{2d^2x^2} - \frac{b\ln(x^n)e^3\ln(x)}{d^4} - \frac{b\,e^2n}{d^3x} + \frac{ben}{4d^2x^2} - \frac{bn}{9d\,x^3} + \frac{bn\,e^3\ln(x)^2}{2d^4} -$

input
```
int((a+b*ln(c*x^n))/x^4/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)*e^3/d^4*ln(e*x+d)-1/3*b*ln(x^n)/d/x^3-b*ln(x^n)*e^2/d^3/x+1/2*b*
ln(x^n)*e/d^2/x^2-b*ln(x^n)*e^3/d^4*ln(x)-b*e^2*n/d^3/x+1/4*b*e*n/d^2/x^2-
1/9*b*n/d/x^3+1/2*b*n*e^3/d^4*ln(x)^2-b*n*e^3/d^4*ln(e*x+d)*ln(-e*x/d)-b*n
*e^3/d^4*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/
2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-
1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(e^3/d^4*ln(e*x+d)-1/3/d/x^3-e^2/d^3
/x+1/2*e/d^2/x^2-e^3/d^4*ln(x))
```

3.38.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^5 + d*x^4), x)
```

3.38.6 Sympy [A] (verification not implemented)

Time = 52.48 (sec) , antiderivative size = 314, normalized size of antiderivative = 2.09

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx=-\frac{a}{3dx^3}+\frac{ae}{2d^2x^2}-\frac{ae^2}{d^3x}+\frac{ae^4\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^4}-\frac{ae^3\log(x)}{d^4}-\frac{bn}{9dx^3}-\frac{b\log(cx^n)}{3dx^3}+\frac{ben}{4d^2x^2}+\frac{be\log(cx^n)}{2d^2x^2}-\frac{be^2n}{d^3x}-\frac{be^2\log(cx^n)}{d^3x}-\frac{be^4n\left(\begin{cases}\frac{x}{d} & \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\wedge |x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{d^4}+\frac{be^4\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^4}+\frac{be^3n\log(x)^2}{2d^4}-\frac{be^3\log(x)\log(cx^n)}{d^4}$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x+d),x)
```

output
```
-a/(3*d*x**3) + a*e/(2*d**2*x**2) - a*e**2/(d**3*x) + a*e**4*Piecewise((x/
d, Eq(e, 0)), (log(d + e*x)/e, True))/d**4 - a*e**3*log(x)/d**4 - b*n/(9*d
*x**3) - b*log(c*x**n)/(3*d*x**3) + b*e*n/(4*d**2*x**2) + b*e*log(c*x**n)/
(2*d**2*x**2) - b*e**2*n/(d**3*x) - b*e**2*log(c*x**n)/(d**3*x) - b*e**4*n
*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d)
, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_pola
r(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi
)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + mei
jerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi
)/d), True))/e, True))/d**4 + b*e**4*Piecewise((x/d, Eq(e, 0)), (log(d + e
*x)/e, True))*log(c*x**n)/d**4 + b*e**3*n*log(x)**2/(2*d**4) - b*e**3*log(
x)*log(c*x**n)/d**4
```

3.38.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x+d),x, algorithm="maxima")
```

output
```
1/6*a*(6*e^3*log(e*x + d)/d^4 - 6*e^3*log(x)/d^4 - (6*e^2*x^2 - 3*d*e*x +
2*d^2)/(d^3*x^3)) + b*integrate((log(c) + log(x^n))/(e*x^5 + d*x^4), x)
```

3.38.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex)}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)*x^4), x)
```

3.38.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4(d+ex)}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^4\,\left(d+e\,x\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x)), x)
```

3.39 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx$

3.39.1 Optimal result

Integrand size = 21, antiderivative size = 152

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx = \frac{3bdnx}{e^3}-\frac{d(3a+bn)x}{e^3}-\frac{3bnx^2}{4e^2}-\frac{3bdx\log(cx^n)}{e^3}-\frac{x^3(a+b\log(cx^n))}{e(d+ex)}+\frac{x^2(3a+bn+3b\log(cx^n))}{2e^2}+\frac{d^2(3a+bn+3b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^4}+\frac{3bd^2n\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}$$

output
```
3*b*d*n*x/e^3-d*(b*n+3*a)*x/e^3-3/4*b*n*x^2/e^2-3*b*d*x*ln(c*x^n)/e^3-x^3*
(a+b*ln(c*x^n))/e/(e*x+d)+1/2*x^2*(3*a+b*n+3*b*ln(c*x^n))/e^2+d^2*(3*a+b*n
+3*b*ln(c*x^n))*ln(1+e*x/d)/e^4+3*b*d^2*n*polylog(2,-e*x/d)/e^4
```

3.39.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 141, normalized size of antiderivative = 0.93

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx = \frac{-8adex+8bdenx-be^2nx^2-8bdex\log(cx^n)+2e^2x^2(a+b\log(cx^n))+\frac{4d^3(a+b\log(cx^n))}{d+ex}-4bd^2n(\log(x)-}{4e^4}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
(-8*a*d*e*x + 8*b*d*e*n*x - b*e^2*n*x^2 - 8*b*d*e*x*Log[c*x^n] + 2*e^2*x^2
*(a + b*Log[c*x^n]) + (4*d^3*(a + b*Log[c*x^n]))/(d + e*x) - 4*b*d^2*n*(Lo
g[x] - Log[d + e*x]) + 12*d^2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 12*b*d
^2*n*PolyLog[2, -((e*x)/d)])/(4*e^4)
```

3.39.3 Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 157, normalized size of antiderivative = 1.03, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2784, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}dx$$

$$\Big\downarrow \; 2784$$

$$\frac{\int \frac{x^2(3a+bn+3b\log(cx^n))}{d+ex}dx}{e}-\frac{x^3(a+b\log(cx^n))}{e(d+ex)}$$

$$\Big\downarrow \; 2793$$

$$\frac{\int \left(\frac{(3a+bn+3b\log(cx^n))d^2}{e^2(d+ex)}-\frac{(3a+bn+3b\log(cx^n))d}{e^2}+\frac{x(3a+bn+3b\log(cx^n))}{e}\right)dx}{e}-\frac{x^3(a+b\log(cx^n))}{e(d+ex)}$$

$$\Big\downarrow \; 2009$$

$$\frac{\frac{d^2\log\left(\frac{ex}{d}+1\right)(3a+3b\log(cx^n)+bn)}{e^3}+\frac{x^2(3a+3b\log(cx^n)+bn)}{2e}-\frac{dx(3a+bn)}{e^2}-\frac{3bdx\log(cx^n)}{e^2}+\frac{3bd^2n\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{3bdnx}{e^2}-\frac{3bnx^2}{4e}}{e}$$
$$\frac{x^3(a+b\log(cx^n))}{e(d+ex)}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
-((x^3*(a + b*Log[c*x^n]))/(e*(d + e*x))) + ((3*b*d*n*x)/e^2 - (d*(3*a + b
*n)*x)/e^2 - (3*b*n*x^2)/(4*e) - (3*b*d*x*Log[c*x^n])/e^2 + (x^2*(3*a + b*
n + 3*b*Log[c*x^n]))/(2*e) + (d^2*(3*a + b*n + 3*b*Log[c*x^n])*Log[1 + (e*
x)/d])/e^3 + (3*b*d^2*n*PolyLog[2, -((e*x)/d)])/e^3)/e
```

3.39.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.39.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.41 (sec) , antiderivative size = 298, normalized size of antiderivative = 1.96

method	result
risch	$\frac{b\ln(x^n)x^2}{2e^2} - \frac{2b\ln(x^n)dx}{e^3} + \frac{3b\ln(x^n)d^2\ln(ex+d)}{e^4} + \frac{b\ln(x^n)d^3}{e^4(ex+d)} - \frac{3bn\,d^2\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^4} - \frac{3bn\,d^2\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e^4} - \frac{bn\,x^2}{4e^2}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e^2*x^2-2*b*ln(x^n)/e^3*d*x+3*b*ln(x^n)/e^4*d^2*ln(e*x+d)+b*
ln(x^n)*d^3/e^4/(e*x+d)-3*b*n/e^4*d^2*ln(e*x+d)*ln(-e*x/d)-3*b*n/e^4*d^2*d
ilog(-e*x/d)-1/4*b*n*x^2/e^2+2*b*d*n*x/e^3+9/4*b*n/e^4*d^2+b*n/e^4*d^2*ln(
e*x+d)-b*n/e^4*d^2*ln(e*x)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n
)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n
)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/e^3*(1/2*e*x^2-2*d*x)+3/e^4*d
^2*ln(e*x+d)+d^3/e^4/(e*x+d))
```

3.39.5 Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e^2*x^2 + 2*d*e*x + d^2), x)
```

3.39.6 Sympy [A] (verification not implemented)

Time = 24.56 (sec) , antiderivative size = 323, normalized size of antiderivative = 2.12

$$
\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx
$$

$$
= -\frac{ad^3\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{e^3} + \frac{3ad^2\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^3} - \frac{2adx}{e^3} + \frac{ax^2}{2e^2}
$$

$$
+ \frac{bd^3n\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{\log(x)}{de} + \frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{e^3} - \frac{bd^3\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}
$$

$$
- \frac{3bd^2n\left(\begin{cases}\frac{x}{d} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|< \\ \log(d)\log(x) - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1 \\ -\log(d)\log\left(\frac{1}{x}\right) - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(d) + G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d) - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{e^3}
$$

$$
+ \frac{3bd^2\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}
$$

$$
+ \frac{2bdnx}{e^3} - \frac{2bdx\log(cx^n)}{e^3} - \frac{bnx^2}{4e^2} + \frac{bx^2\log(cx^n)}{2e^2}
$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**2,x)
```

output
```
-a*d**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**3 + 3*
a*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**3 - 2*a*d*x/e
**3 + a*x**2/(2*e**2) + b*d**3*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d
*e) + log(d/e + x)/(d*e), True))/e**3 - b*d**3*Piecewise((x/d**2, Eq(e, 0)
), (-1/(d*e + e**2*x), True))*log(c*x**n)/e**3 - 3*b*d**2*n*Piecewise((x/d
, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1)
& (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs
(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x)
< 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), (
)), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e,
 True))/e**3 + 3*b*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))
*log(c*x**n)/e**3 + 2*b*d*n*x/e**3 - 2*b*d*x*log(c*x**n)/e**3 - b*n*x**2/(
4*e**2) + b*x**2*log(c*x**n)/(2*e**2)
```

3.39.7 Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
```

output
```
1/2*(2*d^3/(e^5*x + d*e^4) + 6*d^2*log(e*x + d)/e^4 + (e*x^2 - 4*d*x)/e^3)
*a + b*integrate((x^3*log(c) + x^3*log(x^n))/(e^2*x^2 + 2*d*e*x + d^2), x)
```

3.39.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x + d)^2, x)
```

3.39.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^2}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^2,x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^2, x)
```

3.40 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx$

3.40.1 Optimal result

Integrand size = 21, antiderivative size = 98

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx = -\frac{bnx}{e^2}+\frac{2x(a+b\log(cx^n))}{e^2}-\frac{x^2(a+b\log(cx^n))}{e(d+ex)} - \frac{d(2a+bn+2b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3} - \frac{2bdn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}$$

output
```
-b*n*x/e^2+2*x*(a+b*ln(c*x^n))/e^2-x^2*(a+b*ln(c*x^n))/e/(e*x+d)-d*(2*a+b*
n+2*b*ln(c*x^n))*ln(1+e*x/d)/e^3-2*b*d*n*polylog(2,-e*x/d)/e^3
```

3.40.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 98, normalized size of antiderivative = 1.00

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx = \frac{aex-benx+bex\log(cx^n)-\frac{d^2(a+b\log(cx^n))}{d+ex}+bdn(\log(x)-\log(d+ex))-2d(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
(a*e*x - b*e*n*x + b*e*x*Log[c*x^n] - (d^2*(a + b*Log[c*x^n]))/(d + e*x) +
 b*d*n*(Log[x] - Log[d + e*x]) - 2*d*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] -
 2*b*d*n*PolyLog[2, -((e*x)/d)])/e^3
```

3.40.3 Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.14, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2784, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}dx$$

$$\Big\downarrow \text{2784}$$

$$\frac{\int \frac{x(2a+bn+2b\log(cx^n))}{d+ex}dx}{e}-\frac{x^2(a+b\log(cx^n))}{e(d+ex)}$$

$$\Big\downarrow \text{2793}$$

$$\frac{\int \left(\frac{2a+bn+2b\log(cx^n)}{e}-\frac{d(2a+bn+2b\log(cx^n))}{e(d+ex)}\right)dx}{e}-\frac{x^2(a+b\log(cx^n))}{e(d+ex)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{-\frac{d\log\left(\frac{ex}{d}+1\right)(2a+2b\log(cx^n)+bn)}{e^2}+\frac{x(2a+bn)}{e}+\frac{2bx\log(cx^n)}{e}-\frac{2bdn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{2bnx}{e}}{e}-\frac{x^2(a+b\log(cx^n))}{e(d+ex)}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
-((x^2*(a + b*Log[c*x^n]))/(e*(d + e*x))) + ((-2*b*n*x)/e + ((2*a + b*n)*x
)/e + (2*b*x*Log[c*x^n])/e - (d*(2*a + b*n + 2*b*Log[c*x^n])*Log[1 + (e*x)
/d])/e^2 - (2*b*d*n*PolyLog[2, -((e*x)/d)])/e^2)/e
```

3.40.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.40.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.41 (sec) , antiderivative size = 250, normalized size of antiderivative = 2.55

method	result
risch	$\frac{b\ln(x^n)x}{e^2}-\frac{2b\ln(x^n)d\ln(ex+d)}{e^3}-\frac{b\ln(x^n)d^2}{e^3(ex+d)}-\frac{bnd\ln(ex+d)}{e^3}+\frac{bnd\ln(ex)}{e^3}-\frac{bnx}{e^2}-\frac{bnd}{e^3}+\frac{2bnd\ln(ex+d)\ln(-\frac{ex}{d})}{e^3}+$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e^2*x-2*b*ln(x^n)/e^3*d*ln(e*x+d)-b*ln(x^n)/e^3*d^2/(e*x+d)-b*n/
e^3*d*ln(e*x+d)+b*n/e^3*d*ln(e*x)-b*n*x/e^2-b*n/e^3*d+2*b*n/e^3*d*ln(e*x+d
)*ln(-e*x/d)+2*b*n/e^3*d*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*
csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(x/e^2-2/e^3*d*ln(e*
x+d)-1/e^3*d^2/(e*x+d))
```

3.40.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e^2*x^2 + 2*d*e*x + d^2), x)
```

3.40.6 Sympy [A] (verification not implemented)

Time = 12.08 (sec) , antiderivative size = 269, normalized size of antiderivative = 2.74

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx = \frac{ad^2\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{e^2}$$

$$-\frac{2ad\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^2}+\frac{ax}{e^2}-\frac{bd^2n\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{\log(x)}{de}+\frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{e^2}$$

$$+\frac{bd^2\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}$$

$$+\frac{2bdn\left(\begin{cases}\frac{x}{d}\\ \frac{\begin{cases}-\mathrm{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\mathrm{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\mathrm{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\mathrm{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{e^2}$$

$$-\frac{2bd\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}-\frac{bnx}{e^2}+\frac{bx\log(cx^n)}{e^2}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**2,x)
```

output
```
a*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**2 - 2*a
*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**2 + a*x/e**2 - b*
d**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e),
True))/e**2 + b*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), Tru
e))*log(c*x**n)/e**2 + 2*b*d*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-pol
ylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*lo
g(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) -
 polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)),
 ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) -
 polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/e**2 - 2*b*d*Piecewis
e((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**2 - b*n*x/e**2 +
 b*x*log(c*x**n)/e**2
```

3.40.7 Maxima [F]

$$\int \frac{x^2(a + b\log(cx^n))}{(d + ex)^2}\,dx = \int \frac{(b\log(cx^n) + a)x^2}{(ex + d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
```

output
```
-a*(d^2/(e^4*x + d*e^3) - x/e^2 + 2*d*log(e*x + d)/e^3) + b*integrate((x^2
*log(c) + x^2*log(x^n))/(e^2*x^2 + 2*d*e*x + d^2), x)
```

3.40.8 Giac [F]

$$\int \frac{x^2(a + b\log(cx^n))}{(d + ex)^2}\,dx = \int \frac{(b\log(cx^n) + a)x^2}{(ex + d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x + d)^2, x)
```

3.40.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^2}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^2,x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^2, x)
```

3.41 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx$

3.41.1 Optimal result

Integrand size = 19, antiderivative size = 65

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx = -\frac{x(a+b\log(cx^n))}{e(d+ex)}+\frac{(a+bn+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2} + \frac{bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}$$

output
```
-x*(a+b*ln(c*x^n))/e/(e*x+d)+(a+b*n+b*ln(c*x^n))*ln(1+e*x/d)/e^2+b*n*polyl
og(2,-e*x/d)/e^2
```

3.41.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.09

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx = \frac{\frac{d(a+b\log(cx^n))}{d+ex}-bn(\log(x)-\log(d+ex))+(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)+bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
((d*(a + b*Log[c*x^n]))/(d + e*x) - b*n*(Log[x] - Log[d + e*x]) + (a + b*L
og[c*x^n])*Log[1 + (e*x)/d] + b*n*PolyLog[2, -((e*x)/d)])/e^2
```

3.41.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 70, normalized size of antiderivative = 1.08, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}dx$$

$$\Big\downarrow \text{2784}$$

$$\frac{\int \frac{a+bn+b\log(cx^n)}{d+ex}dx}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}$$

$$\Big\downarrow \text{2754}$$

$$\frac{\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{e}-\frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{e}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
-((x*(a + b*Log[c*x^n]))/(e*(d + e*x))) + (((a + b*n + b*Log[c*x^n])*Log[1
 + (e*x)/d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e)/e
```

3.41.3.1 Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.41.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.78 (sec) , antiderivative size = 205, normalized size of antiderivative = 3.15

method	result
risch	$\frac{b\ln(x^n)\ln(ex+d)}{e^2}+\frac{b\ln(x^n)d}{e^2(ex+d)}-\frac{bn\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{e^2}-\frac{bn\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{e^2}+\frac{bn\ln(ex+d)}{e^2}-\frac{bn\ln(ex)}{e^2}+\Big(-\frac{ib\pi\ \mathrm{csgn}(ic)\ \mathrm{cs}$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e^2*ln(e*x+d)+b*ln(x^n)/e^2*d/(e*x+d)-b*n/e^2*ln(e*x+d)*ln(-e*x/
d)-b*n/e^2*dilog(-e*x/d)+b*n/e^2*ln(e*x+d)-b*n/e^2*ln(e*x)+(-1/2*I*b*Pi*cs
gn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2
*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*
(1/e^2*ln(e*x+d)+1/e^2*d/(e*x+d))
```

3.41.5 Fricas [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx=\int \frac{(b\log(cx^n)+a)x}{(ex+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x^n) + a*x)/(e^2*x^2 + 2*d*e*x + d^2), x)
```

3.41.6 Sympy [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d)**2,x)
```

output
```
Integral(x*(a + b*log(c*x**n))/(d + e*x)**2, x)
```

3.41.7 Maxima [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{(ex+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
```

output
```
a*(d/(e^3*x + d*e^2) + log(e*x + d)/e^2) + b*integrate((x*log(c) + x*log(x
^n))/(e^2*x^2 + 2*d*e*x + d^2), x)
```

3.41.8 Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{(ex+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x + d)^2, x)
```

3.41.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}\,dx=\int \frac{x\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{{\left(d+e\,x\right)}^2}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^2,x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^2, x)
```

3.42 $\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx$

3.42.1 Optimal result

Integrand size = 18, antiderivative size = 39

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx = \frac{x(a+b\log(cx^n))}{d(d+ex)} - \frac{bn\log(d+ex)}{de}$$

output
```
x*(a+b*ln(c*x^n))/d/(e*x+d)-b*n*ln(e*x+d)/d/e
```

3.42.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.05

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx = \frac{-\frac{a+b\log(cx^n)}{d+ex} + \frac{bn(\log(x)-\log(d+ex))}{d}}{e}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x)^2,x]
```

output
```
(-((a + b*Log[c*x^n])/(d + e*x)) + (b*n*(Log[x] - Log[d + e*x]))/d)/e
```

3.42.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2751, 16}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx$$

$$\Big\downarrow \ 2751$$

$$\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}$$

$$\Big\downarrow \ 16$$

$$\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x)^2,x]
```

output
```
(x*(a + b*Log[c*x^n]))/(d*(d + e*x)) - (b*n*Log[d + e*x])/(d*e)
```

3.42.3.1 Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

3.42.4 Maple [A] (verified)

Time = 0.40 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.38

method	result
parallelrisch	$-\frac{\ln(ex+d)benx+\ln(ex+d)bdn-bex\ln(c\,x^{n})-aex}{d(ex+d)e}$
risch	$-\frac{b\ln(x^{n})}{e(ex+d)}-\frac{-i\pi bd\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^{n})\,\mathrm{csgn}(ic\,x^{n})+i\pi bd\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^{n})^{2}+i\pi bd\ \mathrm{csgn}(ix^{n})\,\mathrm{csgn}(ic\,x^{n})^{2}-i\pi bd\,\mathrm{csgn}(ic\,x}{2(ex+d)ed}$

input
```
int((a+b*ln(c*x^n))/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-(ln(e*x+d)*b*e*n*x+ln(e*x+d)*b*d*n-b*e*x*ln(c*x^n)-a*e*x)/d/(e*x+d)/e
```

3.42.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.31

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx=\frac{benx\log(x)-bd\log(c)-ad-(benx+bdn)\log(ex+d)}{de^2x+d^2e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
```

output
```
(b*e*n*x*log(x) - b*d*log(c) - a*d - (b*e*n*x + b*d*n)*log(e*x + d))/(d*e^
2*x + d^2*e)
```

3.42.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 153 vs. $2(31) = 62$.

Time = 0.62 (sec) , antiderivative size = 153, normalized size of antiderivative = 3.92

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx$$
$$=\begin{cases}\tilde{\infty}\left(-\frac{a}{x}-\frac{bn}{x}-\frac{b\log(cx^n)}{x}\right) & \text{for } d=0\wedge e=0\\ \frac{ax-bnx+bx\log(cx^n)}{d^2} & \text{for } e=0\\ \frac{-\frac{a}{x}-\frac{bn}{x}-\frac{b\log(cx^n)}{x}}{e^2} & \text{for } d=0\\ -\frac{ad}{d^2e+de^2x}-\frac{bdn\log\left(\frac{d}{e}+x\right)}{d^2e+de^2x}-\frac{benx\log\left(\frac{d}{e}+x\right)}{d^2e+de^2x}+\frac{bex\log(cx^n)}{d^2e+de^2x} & \text{otherwise}\end{cases}$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d)**2,x)
```

output
```
Piecewise((zoo*(-a/x - b*n/x - b*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((a
*x - b*n*x + b*x*log(c*x**n))/d**2, Eq(e, 0)), ((-a/x - b*n/x - b*log(c*x*
*n)/x)/e**2, Eq(d, 0)), (-a*d/(d**2*e + d*e**2*x) - b*d*n*log(d/e + x)/(d*
*2*e + d*e**2*x) - b*e*n*x*log(d/e + x)/(d**2*e + d*e**2*x) + b*e*x*log(c*
x**n)/(d**2*e + d*e**2*x), True))
```

3.42.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.62

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx = -bn\left(\frac{\log(ex+d)}{de} - \frac{\log(x)}{de}\right) - \frac{b\log(cx^n)}{e^2x+de} - \frac{a}{e^2x+de}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
```

output
```
-b*n*(log(e*x + d)/(d*e) - log(x)/(d*e)) - b*log(c*x^n)/(e^2*x + d*e) - a/
(e^2*x + d*e)
```

3.42.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.64

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx = -\frac{bn\log(x)}{e^2x+de} - \frac{bn\log(ex+d)}{de} + \frac{bn\log(x)}{de} - \frac{b\log(c)+a}{e^2x+de}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
```

output
```
-b*n*log(x)/(e^2*x + d*e) - b*n*log(e*x + d)/(d*e) + b*n*log(x)/(d*e) - (b
*log(c) + a)/(e^2*x + d*e)
```

3.42.9 Mupad [B] (verification not implemented)

Time = 1.32 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.38

$$\int \frac{a+b\log(cx^n)}{(d+ex)^2}\,dx = -\frac{a}{x\,e^2+d\,e} - \frac{b\,\ln(c\,x^n)}{e\,(d+e\,x)} - \frac{2\,b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{d\,e}$$

input
```
int((a + b*log(c*x^n))/(d + e*x)^2,x)
```

output
```
- a/(d*e + e^2*x) - (b*log(c*x^n))/(e*(d + e*x)) - (2*b*n*atanh((2*e*x)/d
+ 1))/(d*e)
```

3.43 $\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx$

3.43.1 Optimal result

Integrand size = 21, antiderivative size = 80

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx = -\frac{ex(a+b\log(cx^n))}{d^2(d+ex)} - \frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^2} + \frac{bn\log(d+ex)}{d^2} + \frac{bn\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2}$$

output
```
-e*x*(a+b*ln(c*x^n))/d^2/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))/d^2+b*n*ln(e*
x+d)/d^2+b*n*polylog(2,-d/e/x)/d^2
```

3.43.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.20

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx = \frac{\frac{2d(a+b\log(cx^n))}{d+ex} + \frac{(a+b\log(cx^n))^2}{bn} - 2bn(\log(x)-\log(d+ex)) - 2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 2bn\operatorname{PolyLog}}{2d^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^2),x]
```

output
```
((2*d*(a + b*Log[c*x^n]))/(d + e*x) + (a + b*Log[c*x^n])^2/(b*n) - 2*b*n*(
Log[x] - Log[d + e*x]) - 2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 2*b*n*Pol
yLog[2, -((e*x)/d)])/(2*d^2)
```

3.43.3 Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.18, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {2789, 2751, 16, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx$$

$$\Big\downarrow \text{2789}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}$$

$$\Big\downarrow \text{2751}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{16}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x)^2),x]
```

output
```
-((e*((x*(a + b*Log[c*x^n]))/(d*(d + e*x)) - (b*n*Log[d + e*x])/(d*e)))/d)
 + (-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x)
)])/d)/d
```

3.43.3.1 Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.43.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.44 (sec) , antiderivative size = 229, normalized size of antiderivative = 2.86

method	result
risch	$-\frac{b\ln(x^n)\ln(ex+d)}{d^2}+\frac{b\ln(x^n)}{d(ex+d)}+\frac{b\ln(x^n)\ln(x)}{d^2}-\frac{bn\ln(x)^2}{2d^2}+\frac{bn\ln(ex+d)}{d^2}-\frac{bn\ln(x)}{d^2}+\frac{bn\ln(ex+d)\ln(-\frac{ex}{d})}{d^2}+\frac{bn\,\mathrm{dilo}}{}$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d^2*ln(e*x+d)+b*ln(x^n)/d/(e*x+d)+b*ln(x^n)/d^2*ln(x)-1/2*b*n/d
^2*ln(x)^2+b*n*ln(e*x+d)/d^2-b*n/d^2*ln(x)+b*n/d^2*ln(e*x+d)*ln(-e*x/d)+b*
n/d^2*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I
*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2
*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-1/d^2*ln(e*x+d)+1/d/(e*x+d)+1/d^2*ln(
x))
```

3.43.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^3 + 2*d*e*x^2 + d^2*x), x)
```

3.43.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx = \int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(x*(d + e*x)**2), x)
```

3.43.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^2,x, algorithm="maxima")
```

output
```
a*(1/(d*e*x + d^2) - log(e*x + d)/d^2 + log(x)/d^2) + b*integrate((log(c)
+ log(x^n))/(e^2*x^3 + 2*d*e*x^2 + d^2*x), x)
```

3.43.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^2*x), x)
```

3.43.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^2}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^2), x)
```

3.44 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}\,dx$

3.44.1 Optimal result

Integrand size = 21, antiderivative size = 114

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}\,dx = -\frac{bn}{d^2x}-\frac{a+b\log(cx^n)}{d^2x}+\frac{e^2x(a+b\log(cx^n))}{d^3(d+ex)} + \frac{2e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^3} - \frac{ben\log(d+ex)}{d^3}-\frac{2ben\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}$$

output
```
-b*n/d^2/x+(-a-b*ln(c*x^n))/d^2/x+e^2*x*(a+b*ln(c*x^n))/d^3/(e*x+d)+2*e*ln
(1+d/e/x)*(a+b*ln(c*x^n))/d^3-b*e*n*ln(e*x+d)/d^3-2*b*e*n*polylog(2,-d/e/x
)/d^3
```

3.44.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 120, normalized size of antiderivative = 1.05

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}\,dx = -\frac{\frac{bdn}{x}+\frac{d(a+b\log(cx^n))}{x}+\frac{de(a+b\log(cx^n))}{d+ex}+\frac{e(a+b\log(cx^n))^2}{bn}-ben(\log(x)-\log(d+ex))-2e(a+b\log(cx^n))\,\mathrm{lo}}{d^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^2),x]
```

output
```
-(((b*d*n)/x + (d*(a + b*Log[c*x^n]))/x + (d*e*(a + b*Log[c*x^n]))/(d + e*
x) + (e*(a + b*Log[c*x^n])^2)/(b*n) - b*e*n*(Log[x] - Log[d + e*x]) - 2*e*
(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 2*b*e*n*PolyLog[2, -((e*x)/d)])/d^3)
```

3.44.3 Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log\left(cx^n\right)}{x^2(d+ex)^2}dx$$

$$\Big\downarrow \text{ 2793}$$

$$\int \left(\frac{e^2(a+b\log\left(cx^n\right))}{d^2(d+ex)^2}-\frac{2e(a+b\log\left(cx^n\right))}{d^2x(d+ex)}+\frac{a+b\log\left(cx^n\right)}{d^2x^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{e^2x(a+b\log\left(cx^n\right))}{d^3(d+ex)}+\frac{2e\log\left(\frac{d}{ex}+1\right)\left(a+b\log\left(cx^n\right)\right)}{d^3}-\frac{a+b\log\left(cx^n\right)}{d^2x}-\frac{2ben\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}-\frac{ben\log(d+ex)}{d^3}-\frac{bn}{d^2x}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^2),x]
```

output
```
-((b*n)/(d^2*x)) - (a + b*Log[c*x^n])/(d^2*x) + (e^2*x*(a + b*Log[c*x^n]))
/(d^3*(d + e*x)) + (2*e*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^3 - (b*e*n*
Log[d + e*x])/d^3 - (2*b*e*n*PolyLog[2, -(d/(e*x))])/d^3
```

3.44.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.44.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.44 (sec) , antiderivative size = 276, normalized size of antiderivative = 2.42

method	result
risch	$-\frac{b\ln(x^n)e}{d^2(ex+d)}+\frac{2b\ln(x^n)e\ln(ex+d)}{d^3}-\frac{b\ln(x^n)}{d^2x}-\frac{2b\ln(x^n)e\ln(x)}{d^3}+\frac{bne\ln(x)^2}{d^3}-\frac{2bne\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{d^3}-\frac{2bne\,\mathrm{dilog}\left(-\frac{e}{}\right.}{d^3}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d^2*e/(e*x+d)+2*b*ln(x^n)/d^3*e*ln(e*x+d)-b*ln(x^n)/d^2/x-2*b*l
n(x^n)/d^3*e*ln(x)+b*n/d^3*e*ln(x)^2-2*b*n/d^3*e*ln(e*x+d)*ln(-e*x/d)-2*b*
n/d^3*e*dilog(-e*x/d)-b*e*n*ln(e*x+d)/d^3-b*n/d^2/x+b*n/d^3*e*ln(x)+(-1/2*
I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x
^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*
ln(c)+a)*(-1/d^2*e/(e*x+d)+2/d^3*e*ln(e*x+d)-1/d^2/x-2/d^3*e*ln(x))
```

3.44.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^4 + 2*d*e*x^3 + d^2*x^2), x)
```

3.44.6 Sympy [A] (verification not implemented)

Time = 30.60 (sec) , antiderivative size = 318, normalized size of antiderivative = 2.79

$$
\begin{aligned}
\int \frac{a+b\log(cx^n)}{x^2(d+ex)^2}\,dx &= \frac{ae^2\left(\begin{cases} \frac{x}{d^2} & \text{for } e=0 \\ -\frac{1}{de+e^2x} & \text{otherwise} \end{cases}\right)}{d^2} \\
&- \frac{a}{d^2x} + \frac{2ae^2\left(\begin{cases} \frac{x}{d} & \text{for } e=0 \\ \frac{\log(d+ex)}{e} & \text{otherwise} \end{cases}\right)}{d^3} - \frac{2ae\log(x)}{d^3} \\
&- \frac{be^2n\left(\begin{cases} \frac{x}{d^2} & \text{for } e=0 \\ -\frac{\log(x)}{de} + \frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise} \end{cases}\right)}{d^2} \\
&+ \frac{be^2\left(\begin{cases} \frac{x}{d^2} & \text{for } e=0 \\ -\frac{1}{de+e^2x} & \text{otherwise} \end{cases}\right)\log(cx^n)}{d^2} - \frac{bn}{d^2x} - \frac{b\log(cx^n)}{d^2x} \\
&- \frac{2be^2n\left(\left(\begin{cases} \frac{x}{d} \\ \frac{\begin{cases} -\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|< \\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1 \\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise} \end{cases}}{e} \end{cases}\right.\right.}{d^3} \\
&+ \frac{2be^2\left(\begin{cases} \frac{x}{d} & \text{for } e=0 \\ \frac{\log(d+ex)}{e} & \text{otherwise} \end{cases}\right)\log(cx^n)}{d^3} + \frac{ben\log(x)^2}{d^3} - \frac{2be\log(x)\log(cx^n)}{d^3}
\end{aligned}
$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**2,x)
```

output
```
a*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**2 - a/(
d**2*x) + 2*a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d**3
 - 2*a*e*log(x)/d**3 - b*e**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*
e) + log(d/e + x)/(d*e), True))/d**2 + b*e**2*Piecewise((x/d**2, Eq(e, 0))
, (-1/(d*e + e**2*x), True))*log(c*x**n)/d**2 - b*n/(d**2*x) - b*log(c*x**
n)/(d**2*x) - 2*b*e**2*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2
, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) -
 polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polyl
og(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0,
0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polyl
og(2, e*x*exp_polar(I*pi)/d), True))/e, True))/d**3 + 2*b*e**2*Piecewise((
x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/d**3 + b*e*n*log(x)**2
/d**3 - 2*b*e*log(x)*log(c*x**n)/d**3
```

3.44.7 Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex)^2}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)^2 x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^2,x, algorithm="maxima")
```

output
```
-a*((2*e*x + d)/(d^2*e*x^2 + d^3*x) - 2*e*log(e*x + d)/d^3 + 2*e*log(x)/d^
3) + b*integrate((log(c) + log(x^n))/(e^2*x^4 + 2*d*e*x^3 + d^2*x^2), x)
```

3.44.8 Giac [F]

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex)^2}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)^2 x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^2*x^2), x)
```

3.44.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{x^2(d+ex)^2}\,dx = \int \frac{a + b\,\ln(c\,x^n)}{x^2\,(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^2), x)
```

3.45 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx$

3.45.1 Optimal result

Integrand size = 21, antiderivative size = 154

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx = -\frac{bn}{4d^2x^2}+\frac{2ben}{d^3x}-\frac{a+b\log(cx^n)}{2d^2x^2}+\frac{2e(a+b\log(cx^n))}{d^3x} -\frac{e^3x(a+b\log(cx^n))}{d^4(d+ex)}-\frac{3e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4} +\frac{be^2n\log(d+ex)}{d^4}+\frac{3be^2n\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}$$

output
```
-1/4*b*n/d^2/x^2+2*b*e*n/d^3/x+1/2*(-a-b*ln(c*x^n))/d^2/x^2+2*e*(a+b*ln(c*
x^n))/d^3/x-e^3*x*(a+b*ln(c*x^n))/d^4/(e*x+d)-3*e^2*ln(1+d/e/x)*(a+b*ln(c*
x^n))/d^4+b*e^2*n*ln(e*x+d)/d^4+3*b*e^2*n*polylog(2,-d/e/x)/d^4
```

3.45.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 165, normalized size of antiderivative = 1.07

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx = -\frac{\frac{bd^2n}{x^2}-\frac{8bden}{x}+\frac{2d^2(a+b\log(cx^n))}{x^2}-\frac{8de(a+b\log(cx^n))}{x}-\frac{4de^2(a+b\log(cx^n))}{d+ex}-\frac{6e^2(a+b\log(cx^n))^2}{bn}+4be^2n(\log(x)-\log(\ldots}{4d^4}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)^2),x]
```

output
```
-1/4*((b*d^2*n)/x^2 - (8*b*d*e*n)/x + (2*d^2*(a + b*Log[c*x^n]))/x^2 - (8*
d*e*(a + b*Log[c*x^n]))/x - (4*d*e^2*(a + b*Log[c*x^n]))/(d + e*x) - (6*e^
2*(a + b*Log[c*x^n])^2)/(b*n) + 4*b*e^2*n*(Log[x] - Log[d + e*x]) + 12*e^2
*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 12*b*e^2*n*PolyLog[2, -((e*x)/d)])/
d^4
```

3.45.3 Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 154, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx$$

$$\Big\downarrow \ 2793$$

$$\int \left(-\frac{e^3(a+b\log(cx^n))}{d^3(d+ex)^2}+\frac{3e^2(a+b\log(cx^n))}{d^3x(d+ex)}-\frac{2e(a+b\log(cx^n))}{d^3x^2}+\frac{a+b\log(cx^n)}{d^2x^3}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-\frac{e^3x(a+b\log(cx^n))}{d^4(d+ex)}-\frac{3e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^4}+\frac{2e(a+b\log(cx^n))}{d^3x}-\frac{a+b\log(cx^n)}{2d^2x^2}+\frac{3be^2n\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}+\frac{be^2n\log(d+ex)}{d^4}+\frac{2ben}{d^3x}-\frac{bn}{4d^2x^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)^2),x]
```

output
```
-1/4*(b*n)/(d^2*x^2) + (2*b*e*n)/(d^3*x) - (a + b*Log[c*x^n])/(2*d^2*x^2)
+ (2*e*(a + b*Log[c*x^n]))/(d^3*x) - (e^3*x*(a + b*Log[c*x^n]))/(d^4*(d +
e*x)) - (3*e^2*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^4 + (b*e^2*n*Log[d +
 e*x])/d^4 + (3*b*e^2*n*PolyLog[2, -(d/(e*x))])/d^4
```

3.45.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.45.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.50 (sec) , antiderivative size = 331, normalized size of antiderivative = 2.15

method	result
risch	$-\frac{3b\ln(x^n)e^2\ln(ex+d)}{d^4}+\frac{b\ln(x^n)e^2}{d^3(ex+d)}-\frac{b\ln(x^n)}{2d^2x^2}+\frac{3b\ln(x^n)e^2\ln(x)}{d^4}+\frac{2b\ln(x^n)e}{d^3x}+\frac{b\,e^2n\ln(ex+d)}{d^4}-\frac{bn}{4d^2x^2}+\frac{2ben}{d^3x}-$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-3*b*ln(x^n)/d^4*e^2*ln(e*x+d)+b*ln(x^n)/d^3*e^2/(e*x+d)-1/2*b*ln(x^n)/d^2
/x^2+3*b*ln(x^n)/d^4*e^2*ln(x)+2*b*ln(x^n)/d^3*e/x+b*e^2*n*ln(e*x+d)/d^4-1
/4*b*n/d^2/x^2+2*b*e*n/d^3/x-b*n/d^4*e^2*ln(x)-3/2*b*n/d^4*e^2*ln(x)^2+3*b
*n/d^4*e^2*ln(e*x+d)*ln(-e*x/d)+3*b*n/d^4*e^2*dilog(-e*x/d)+(-1/2*I*b*Pi*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/
2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)
*(-3/d^4*e^2*ln(e*x+d)+1/d^3*e^2/(e*x+d)-1/2/d^2/x^2+3/d^4*e^2*ln(x)+2/d^3
*e/x)
```

3.45.5 Fricas [F]

$$\int \frac{a + b \log(cx^n)}{x^3(d + ex)^2} \, dx = \int \frac{b \log(cx^n) + a}{(ex + d)^2 x^3} \, dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^5 + 2*d*e*x^4 + d^2*x^3), x)
```

3.45.6 Sympy [A] (verification not implemented)

Time = 43.49 (sec) , antiderivative size = 376, normalized size of antiderivative = 2.44

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^2}\,dx$$

$$= -\frac{a}{2d^2x^2} - \frac{ae^3\left(\begin{cases} \frac{x}{d^2} & \text{for } e=0 \\ -\frac{1}{de+e^2x} & \text{otherwise} \end{cases}\right)}{d^3} + \frac{2ae}{d^3x} - \frac{3ae^3\left(\begin{cases} \frac{x}{d} & \text{for } e=0 \\ \frac{\log(d+ex)}{e} & \text{otherwise} \end{cases}\right)}{d^4}$$

$$+ \frac{3ae^2\log(x)}{d^4} - \frac{bn}{4d^2x^2} - \frac{b\log(cx^n)}{2d^2x^2} + \frac{be^3n\left(\begin{cases} \frac{x}{d^2} & \text{for } e=0 \\ -\frac{\log(x)}{de} + \frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise} \end{cases}\right)}{d^3}$$

$$- \frac{be^3\left(\begin{cases} \frac{x}{d^2} & \text{for } e=0 \\ -\frac{1}{de+e^2x} & \text{otherwise} \end{cases}\right)\log(cx^n)}{d^3} + \frac{2ben}{d^3x} + \frac{2be\log(cx^n)}{d^3x}$$

$$+ \frac{3be^3n\left(\begin{cases} \frac{x}{d} \\ \frac{\begin{cases} -\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|< \\ \log(d)\log(x) - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1 \\ -\log(d)\log\left(\frac{1}{x}\right) - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(d) + G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(d) - \operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise} \end{cases}}{e} \end{cases}\right)}{d^4}$$

$$- \frac{3be^3\left(\begin{cases} \frac{x}{d} & \text{for } e=0 \\ \frac{\log(d+ex)}{e} & \text{otherwise} \end{cases}\right)\log(cx^n)}{d^4} - \frac{3be^2n\log(x)^2}{2d^4} + \frac{3be^2\log(x)\log(cx^n)}{d^4}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**2,x)
```

output
```
-a/(2*d**2*x**2) - a*e**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x)
, True))/d**3 + 2*a*e/(d**3*x) - 3*a*e**3*Piecewise((x/d, Eq(e, 0)), (log(
d + e*x)/e, True))/d**4 + 3*a*e**2*log(x)/d**4 - b*n/(4*d**2*x**2) - b*log
(c*x**n)/(2*d**2*x**2) + b*e**3*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(
d*e) + log(d/e + x)/(d*e), True))/d**3 - b*e**3*Piecewise((x/d**2, Eq(e, 0
)), (-1/(d*e + e**2*x), True))*log(c*x**n)/d**3 + 2*b*e*n/(d**3*x) + 2*b*e
*log(c*x**n)/(d**3*x) + 3*b*e**3*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((
-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d
)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/
x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1,
1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(
d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/d**4 - 3*b*e**3*P
iecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/d**4 - 3*b*e
**2*n*log(x)**2/(2*d**4) + 3*b*e**2*log(x)*log(c*x**n)/d**4
```

3.45.7 Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x^3(d + ex)^2}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)^2 x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^2,x, algorithm="maxima")
```

output
```
1/2*a*((6*e^2*x^2 + 3*d*e*x - d^2)/(d^3*e*x^3 + d^4*x^2) - 6*e^2*log(e*x +
 d)/d^4 + 6*e^2*log(x)/d^4) + b*integrate((log(c) + log(x^n))/(e^2*x^5 + 2
*d*e*x^4 + d^2*x^3), x)
```

3.45.8 Giac [F]

$$\int \frac{a + b\log(cx^n)}{x^3(d + ex)^2}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)^2 x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^2*x^3), x)
```

3.45.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^3(d+ex)^2}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,{\left(d+e\,x\right)}^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^2), x)
```

3.46 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx$

3.46.1 Optimal result

Integrand size = 21, antiderivative size = 149

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx = -\frac{3bnx}{e^3}+\frac{(6a+5bn)x}{2e^3}+\frac{3bx\log(cx^n)}{e^3} - \frac{x^3(a+b\log(cx^n))}{2e(d+ex)^2}-\frac{x^2(3a+bn+3b\log(cx^n))}{2e^2(d+ex)} - \frac{d(6a+5bn+6b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{2e^4} - \frac{3bdn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}$$

output
```
-3*b*n*x/e^3+1/2*(5*b*n+6*a)*x/e^3+3*b*x*ln(c*x^n)/e^3-1/2*x^3*(a+b*ln(c*x
^n))/e/(e*x+d)^2-1/2*x^2*(3*a+b*n+3*b*ln(c*x^n))/e^2/(e*x+d)-1/2*d*(6*a+5*
b*n+6*b*ln(c*x^n))*ln(1+e*x/d)/e^4-3*b*d*n*polylog(2,-e*x/d)/e^4
```

3.46.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.01

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx = \frac{2aex-2benx+2bex\log(cx^n)+\frac{d^3(a+b\log(cx^n))}{(d+ex)^2}-\frac{6d^2(a+b\log(cx^n))}{d+ex}+6bdn(\log(x)-\log(d+ex))-bdn\left(\frac{d}{d+ex}\right.}{2e^4}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
(2*a*e*x - 2*b*e*n*x + 2*b*e*x*Log[c*x^n] + (d^3*(a + b*Log[c*x^n]))/(d +
e*x)^2 - (6*d^2*(a + b*Log[c*x^n]))/(d + e*x) + 6*b*d*n*(Log[x] - Log[d +
e*x]) - b*d*n*(d/(d + e*x) + Log[x] - Log[d + e*x]) - 6*d*(a + b*Log[c*x^n
])*Log[1 + (e*x)/d] - 6*b*d*n*PolyLog[2, -((e*x)/d)])/(2*e^4)
```

3.46.3 Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.04, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2784, 2784, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}dx$$

$$\Big\downarrow \; 2784$$

$$\frac{\int \frac{x^2(3a+bn+3b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^3(a+b\log(cx^n))}{2e(d+ex)^2}$$

$$\Big\downarrow \; 2784$$

$$\frac{\frac{\int \frac{x(6a+5bn+6b\log(cx^n))}{d+ex}dx}{e}-\frac{x^2(3a+3b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^3(a+b\log(cx^n))}{2e(d+ex)^2}$$

$$\Big\downarrow \; 2793$$

$$\frac{\frac{\int \left(\frac{6a+5bn+6b\log(cx^n)}{e}-\frac{d(6a+5bn+6b\log(cx^n))}{e(d+ex)}\right)dx}{e}-\frac{x^2(3a+3b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^3(a+b\log(cx^n))}{2e(d+ex)^2}$$

$$\Big\downarrow \; 2009$$

$$\frac{\frac{-\frac{d\log\left(\frac{ex}{d}+1\right)(6a+6b\log(cx^n)+5bn)}{e^2}+\frac{x(6a+5bn)}{e}+\frac{6bx\log(cx^n)}{e}-\frac{6bdn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{6bnx}{e}}{e}-\frac{x^2(3a+3b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^3(a+b\log(cx^n))}{2e(d+ex)^2}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
-1/2*(x^3*(a + b*Log[c*x^n]))/(e*(d + e*x)^2) + (-((x^2*(3*a + b*n + 3*b*L
og[c*x^n]))/(e*(d + e*x))) + ((-6*b*n*x)/e + ((6*a + 5*b*n)*x)/e + (6*b*x*
Log[c*x^n])/e - (d*(6*a + 5*b*n + 6*b*Log[c*x^n])*Log[1 + (e*x)/d])/e^2 -
(6*b*d*n*PolyLog[2, -((e*x)/d)])/e^2)/e)/(2*e)
```

3.46.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.46.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.44 (sec) , antiderivative size = 303, normalized size of antiderivative = 2.03

method	result
risch	$\frac{b\ln(x^n)x}{e^3}-\frac{3b\ln(x^n)d\ln(ex+d)}{e^4}-\frac{3b\ln(x^n)d^2}{e^4(ex+d)}+\frac{b\ln(x^n)d^3}{2e^4(ex+d)^2}-\frac{bnx}{e^3}-\frac{bnd}{e^4}-\frac{5bnd\ln(ex+d)}{2e^4}-\frac{bn\,d^2}{2e^4(ex+d)}+\frac{5bnd\ln(e}{2e^4}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)*x/e^3-3*b*ln(x^n)/e^4*d*ln(e*x+d)-3*b*ln(x^n)/e^4*d^2/(e*x+d)+1/
2*b*ln(x^n)*d^3/e^4/(e*x+d)^2-b*n*x/e^3-b*n/e^4*d-5/2*b*n/e^4*d*ln(e*x+d)-
1/2*b*n/e^4*d^2/(e*x+d)+5/2*b*n/e^4*d*ln(e*x)+3*b*n/e^4*d*ln(e*x+d)*ln(-e*
x/d)+3*b*n/e^4*d*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c
*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c
*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(x/e^3-3/e^4*d*ln(e*x+d)-3/e
^4*d^2/(e*x+d)+1/2*d^3/e^4/(e*x+d)^2)
```

3.46.5 Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^3}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e^3*x^3 + 3*d*e^2*x^2 + 3*d^2*e*x + d
^3), x)
```

3.46.6 Sympy [A] (verification not implemented)

Time = 27.60 (sec) , antiderivative size = 391, normalized size of antiderivative = 2.62

$$
\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx = -\frac{ad^3\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)}{e^3}
+\frac{3ad^2\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{e^3}-\frac{3ad\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^3}
+\frac{ax}{e^3}+\frac{bd^3n\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2d^2e+2de^2x}-\frac{\log(x)}{2d^2e}+\frac{\log\left(\frac{d}{e}+x\right)}{2d^2e} & \text{otherwise}\end{cases}\right)}{e^3}
-\frac{bd^3\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}
-\frac{3bd^2n\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{\log(x)}{de}+\frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{e^3}+\frac{3bd^2\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}
+\frac{3bdn\left(\begin{cases}\frac{x}{d} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{e^3}
-\frac{3bd\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}-\frac{bnx}{e^3}+\frac{bx\log(cx^n)}{e^3}
$$

input

```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**3,x)
```

3.46. $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx$

output
```
-a*d**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e**3
+ 3*a*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**3 -
 3*a*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**3 + a*x/e**3
+ b*d**3*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log
(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/e**3 - b*d**3*Piecewise((
x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/e**3 - 3*b*d
**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e), T
rue))/e**3 + 3*b*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), Tr
ue))*log(c*x**n)/e**3 + 3*b*d*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-po
lylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*l
og(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x)
- polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1))
, ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d)
- polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/e**3 - 3*b*d*Piecewi
se((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**3 - b*n*x/e**3
+ b*x*log(c*x**n)/e**3
```

3.46.7 Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^3}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

output
```
-1/2*a*((6*d^2*e*x + 5*d^3)/(e^6*x^2 + 2*d*e^5*x + d^2*e^4) - 2*x/e^3 + 6*
d*log(e*x + d)/e^4) + b*integrate((x^3*log(c) + x^3*log(x^n))/(e^3*x^3 + 3
*d*e^2*x^2 + 3*d^2*e*x + d^3), x)
```

3.46.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^3}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^3}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x + d)^3, x)
```

3.46.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log{(cx^n)})}{(d+ex)^3}\,dx = \int \frac{x^3\,\left(a+b\,\ln{\left(c\,x^n\right)}\right)}{{\left(d+e\,x\right)}^3}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^3,x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^3, x)
```

3.47 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx$

3.47.1 Optimal result

Integrand size = 21, antiderivative size = 107

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = -\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2} - \frac{x(2a+bn+2b\log(cx^n))}{2e^2(d+ex)} + \frac{(2a+3bn+2b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{2e^3} + \frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}$$

output
```
-1/2*x^2*(a+b*ln(c*x^n))/e/(e*x+d)^2-1/2*x*(2*a+b*n+2*b*ln(c*x^n))/e^2/(e*
x+d)+1/2*(2*a+3*b*n+2*b*ln(c*x^n))*ln(1+e*x/d)/e^3+b*n*polylog(2,-e*x/d)/e
^3
```

3.47.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 122, normalized size of antiderivative = 1.14

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = \frac{-\frac{d^2(a+b\log(cx^n))}{(d+ex)^2} + \frac{4d(a+b\log(cx^n))}{d+ex} - 4bn(\log(x)-\log(d+ex)) + bn\left(\frac{d}{d+ex}+\log(x)-\log(d+ex)\right) + 2(a+b\ldots}{2e^3}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
(-((d^2*(a + b*Log[c*x^n]))/(d + e*x)^2) + (4*d*(a + b*Log[c*x^n]))/(d + e
*x) - 4*b*n*(Log[x] - Log[d + e*x]) + b*n*(d/(d + e*x) + Log[x] - Log[d +
e*x]) + 2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 2*b*n*PolyLog[2, -((e*x)/d
)])/(2*e^3)
```

3.47.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.08, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2784, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}dx$$

$$\Big\downarrow \text{ 2784}$$

$$\frac{\int \frac{x(2a+bn+2b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}$$

$$\Big\downarrow \text{ 2784}$$

$$\frac{\frac{\int \frac{2a+3bn+2b\log(cx^n)}{d+ex}dx}{e}-\frac{x(2a+2b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}$$

$$\Big\downarrow \text{ 2754}$$

$$\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(2a+2b\log(cx^n)+3bn)}{e}-\frac{2bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x(2a+2b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}$$

$$\Big\downarrow \text{ 2838}$$

$$\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(2a+2b\log(cx^n)+3bn)}{e}+\frac{2bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e}-\frac{x(2a+2b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
-1/2*(x^2*(a + b*Log[c*x^n]))/(e*(d + e*x)^2) + (-((x*(2*a + b*n + 2*b*Log
[c*x^n]))/(e*(d + e*x))) + (((2*a + 3*b*n + 2*b*Log[c*x^n])*Log[1 + (e*x)/
d])/e + (2*b*n*PolyLog[2, -((e*x)/d)])/e)/e)/(2*e)
```

3.47.3.1 Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.47.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.43 (sec) , antiderivative size = 258, normalized size of antiderivative = 2.41

method	result
risch	$\frac{b\ln(x^n)\ln(ex+d)}{e^3}+\frac{2b\ln(x^n)d}{e^3(ex+d)}-\frac{b\ln(x^n)d^2}{2e^3(ex+d)^2}+\frac{bnd}{2e^3(ex+d)}+\frac{3bn\ln(ex+d)}{2e^3}-\frac{3bn\ln(ex)}{2e^3}-\frac{bn\ln(ex+d)\ln(-\frac{ex}{d})}{e^3}-\frac{bn\,d}{}$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e^3*ln(e*x+d)+2*b*ln(x^n)/e^3*d/(e*x+d)-1/2*b*ln(x^n)/e^3*d^2/(e
*x+d)^2+1/2*b*n/e^3*d/(e*x+d)+3/2*b*n/e^3*ln(e*x+d)-3/2*b*n/e^3*ln(e*x)-b*
n/e^3*ln(e*x+d)*ln(-e*x/d)-b*n/e^3*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*cs
gn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/e^3*ln(
e*x+d)+2/e^3*d/(e*x+d)-1/2/e^3*d^2/(e*x+d)^2)
```

3.47.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e^3*x^3 + 3*d*e^2*x^2 + 3*d^2*e*x + d
^3), x)
```

3.47.6 Sympy [A] (verification not implemented)

Time = 19.77 (sec) , antiderivative size = 347, normalized size of antiderivative = 3.24

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx$$

$$= \frac{ad^2\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)}{e^2} - \frac{2ad\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{e^2}$$
$$+ \frac{a\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{e^2} - \frac{bd^2n\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2d^2e+2de^2x} - \frac{\log(x)}{2d^2e} + \frac{\log\left(\frac{d}{e}+x\right)}{2d^2e} & \text{otherwise}\end{cases}\right)}{e^2}$$
$$+ \frac{bd^2\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}$$
$$+ \frac{2bdn\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{\log(x)}{de} + \frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{e^2} - \frac{2bd\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}$$
$$- \frac{bn\left(\begin{cases}\frac{x}{d} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(d)\log(x)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|\, x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|\, x\right)\log(d)-\operatorname{Li}_2\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{e^2}$$
$$+ \frac{b\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**3,x)
```

output
```
a*d**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e**2 -
 2*a*d*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**2 + a*P
iecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**2 - b*d**2*n*Piecewis
e((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + lo
g(d/e + x)/(2*d**2*e), True))/e**2 + b*d**2*Piecewise((x/d**3, Eq(e, 0)),
(-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/e**2 + 2*b*d*n*Piecewise((x/d**
2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e), True))/e**2 - 2*b*d*Pie
cewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/e**2 - b
*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/
d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_po
lar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*
pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + m
eijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*
pi)/d), True))/e, True))/e**2 + b*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)
/e, True))*log(c*x**n)/e**2
```

3.47.7 Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*a*((4*d*e*x + 3*d^2)/(e^5*x^2 + 2*d*e^4*x + d^2*e^3) + 2*log(e*x + d)/
e^3) + b*integrate((x^2*log(c) + x^2*log(x^n))/(e^3*x^3 + 3*d*e^2*x^2 + 3*
d^2*e*x + d^3), x)
```

3.47.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x + d)^3, x)
```

3.47.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^3}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^3,x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^3, x)
```

3.48 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^3} dx$

3.48.1 Optimal result

Integrand size = 19, antiderivative size = 62

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3} dx = -\frac{bn}{2e^2(d+ex)} + \frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2} - \frac{bn\log(d+ex)}{2de^2}$$

output
```
-1/2*b*n/e^2/(e*x+d)+1/2*x^2*(a+b*ln(c*x^n))/d/(e*x+d)^2-1/2*b*n*ln(e*x+d)
/d/e^2
```

3.48.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.21

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3} dx = \frac{bn\log(x) - \frac{bdn(d+ex)+ad(d+2ex)+bd(d+2ex)\log(cx^n)+bn(d+ex)^2\log(d+ex)}{(d+ex)^2}}{2de^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
(b*n*Log[x] - (b*d*n*(d + e*x) + a*d*(d + 2*e*x) + b*d*(d + 2*e*x)*Log[c*x
^n] + b*n*(d + e*x)^2*Log[d + e*x])/(d + e*x)^2)/(2*d*e^2)
```

3.48.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 60, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {2773, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}dx$$

$$\Big\downarrow \text{ 2773}$$

$$\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\int \frac{x}{(d+ex)^2}dx}{2d}$$

$$\Big\downarrow \text{ 49}$$

$$\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\int \left(\frac{1}{e(d+ex)}-\frac{d}{e(d+ex)^2}\right)dx}{2d}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\left(\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}\right)}{2d}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
(x^2*(a + b*Log[c*x^n]))/(2*d*(d + e*x)^2) - (b*n*(d/(e^2*(d + e*x)) + Log
[d + e*x]/e^2))/(2*d)
```

3.48.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

3.48.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 136 vs. 2(56) = 112.

Time = 0.41 (sec) , antiderivative size = 137, normalized size of antiderivative = 2.21

method	result
parallelrisch	$\frac{\ln(x)b\,e^2n\,x^2-\ln(ex+d)b\,e^2n\,x^2+2\ln(x)bdenx-2\ln(ex+d)bdenx+\ln(x)b\,d^2n-\ln(ex+d)b\,d^2n-2b\ln(c\,x^n)dex-bdenx-2adex}{2e^2(ex+d)^2d}$
risch	$-\frac{b(2ex+d)\ln(x^n)}{2(ex+d)^2e^2}-\frac{2i\pi bdex\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2+2i\pi bdex\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2-i\pi b\,d^2\,\mathrm{csgn}(ic\,x^n)^3+i\pi b\,d^2\,\mathrm{csgn}(ix^n)}{}$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
1/2*(ln(x)*b*e^2*n*x^2-ln(e*x+d)*b*e^2*n*x^2+2*ln(x)*b*d*e*n*x-2*ln(e*x+d)
*b*d*e*n*x+ln(x)*b*d^2*n-ln(e*x+d)*b*d^2*n-2*b*ln(c*x^n)*d*e*x-b*d*e*n*x-2
*a*d*e*x-b*ln(c*x^n)*d^2-b*d^2*n-a*d^2)/e^2/(e*x+d)^2/d
```

3.48.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 115 vs. 2(56) = 112.

Time = 0.29 (sec) , antiderivative size = 115, normalized size of antiderivative = 1.85

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx$$
$$=\frac{be^2nx^2\log(x)-bd^2n-ad^2-(bden+2\,ade)x-(be^2nx^2+2\,bdenx+bd^2n)\log(ex+d)-(2\,bdex+bd^2)}{2\,(de^4x^2+2\,d^2e^3x+d^3e^2)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

output
```
1/2*(b*e^2*n*x^2*log(x) - b*d^2*n - a*d^2 - (b*d*e*n + 2*a*d*e)*x - (b*e^2
*n*x^2 + 2*b*d*e*n*x + b*d^2*n)*log(e*x + d) - (2*b*d*e*x + b*d^2)*log(c))
/(d*e^4*x^2 + 2*d^2*e^3*x + d^3*e^2)
```

3.48.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 398 vs. $2(53) = 106$.

Time = 1.79 (sec) , antiderivative size = 398, normalized size of antiderivative = 6.42

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx = \begin{cases} \tilde{\infty}\left(-\frac{a}{x}-\frac{bn}{x}-\frac{b\log(cx^n)}{x}\right) \\ \frac{\frac{ax^2}{2}-\frac{bnx^2}{4}+\frac{bx^2\log(cx^n)}{2}}{d^3} \\ \frac{-\frac{a}{x}-\frac{bn}{x}-\frac{b\log(cx^n)}{x}}{e^3} \\ -\frac{ad^2}{2d^3e^2+4d^2e^3x+2de^4x^2}-\frac{2adex}{2d^3e^2+4d^2e^3x+2de^4x^2}-\frac{bd^2n\log\left(\frac{d}{e}+x\right)}{2d^3e^2+4d^2e^3x+2de^4x^2}-\frac{bd^2n}{2d^3e^2+4d^2e^3x+2de^4x^2}-\frac{2bdenx\log\left(\frac{d}{e}+x\right)}{2d^3e^2+4d^2e^3x+2de^4x^2} \end{cases}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d)**3,x)
```

output
```
Piecewise((zoo*(-a/x - b*n/x - b*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((a
*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**3, Eq(e, 0)), ((-a/x - b*n
/x - b*log(c*x**n)/x)/e**3, Eq(d, 0)), (-a*d**2/(2*d**3*e**2 + 4*d**2*e**3
*x + 2*d*e**4*x**2) - 2*a*d*e*x/(2*d**3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x*
*2) - b*d**2*n*log(d/e + x)/(2*d**3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2)
- b*d**2*n/(2*d**3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2) - 2*b*d*e*n*x*log
(d/e + x)/(2*d**3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2) - b*d*e*n*x/(2*d**
3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2) - b*e**2*n*x**2*log(d/e + x)/(2*d*
*3*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2) + b*e**2*x**2*log(c*x**n)/(2*d**3
*e**2 + 4*d**2*e**3*x + 2*d*e**4*x**2), True))
```

3.48.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 114 vs. $2(56) = 112$.

Time = 0.20 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.84

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx = -\frac{1}{2}\,bn\left(\frac{1}{e^3x+de^2}+\frac{\log(ex+d)}{de^2}-\frac{\log(x)}{de^2}\right) - \frac{(2\,ex+d)b\log(cx^n)}{2\,(e^4x^2+2\,de^3x+d^2e^2)} - \frac{(2\,ex+d)a}{2\,(e^4x^2+2\,de^3x+d^2e^2)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

output
```
-1/2*b*n*(1/(e^3*x + d*e^2) + log(e*x + d)/(d*e^2) - log(x)/(d*e^2)) - 1/2
*(2*e*x + d)*b*log(c*x^n)/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 1/2*(2*e*x + d
)*a/(e^4*x^2 + 2*d*e^3*x + d^2*e^2)
```

3.48.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 124 vs. 2(56) = 112.

Time = 0.32 (sec) , antiderivative size = 124, normalized size of antiderivative = 2.00

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx = -\frac{(2\,benx+bdn)\log(x)}{2\,(e^4x^2+2\,de^3x+d^2e^2)} - \frac{benx+2\,bex\log(c)+bdn+2\,aex+bd\log(c)+ad}{2\,(e^4x^2+2\,de^3x+d^2e^2)} - \frac{bn\log(ex+d)}{2\,de^2} + \frac{bn\log(x)}{2\,de^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

output
```
-1/2*(2*b*e*n*x + b*d*n)*log(x)/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 1/2*(b*e
*n*x + 2*b*e*x*log(c) + b*d*n + 2*a*e*x + b*d*log(c) + a*d)/(e^4*x^2 + 2*d
*e^3*x + d^2*e^2) - 1/2*b*n*log(e*x + d)/(d*e^2) + 1/2*b*n*log(x)/(d*e^2)
```

3.48.9 Mupad [B] (verification not implemented)

Time = 0.76 (sec) , antiderivative size = 108, normalized size of antiderivative = 1.74

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}\,dx = -\frac{a\,d+x\,(2\,a\,e+b\,e\,n)+b\,d\,n}{2\,d^2\,e^2+4\,d\,e^3\,x+2\,e^4\,x^2} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d}{2\,e^2}+\frac{b\,x}{e}\right)}{d^2+2\,d\,e\,x+e^2\,x^2} - \frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{d\,e^2}$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^3,x)
```

output
```
- (a*d + x*(2*a*e + b*e*n) + b*d*n)/(2*d^2*e^2 + 2*e^4*x^2 + 4*d*e^3*x) -
(log(c*x^n)*((b*d)/(2*e^2) + (b*x)/e))/(d^2 + e^2*x^2 + 2*d*e*x) - (b*n*at
anh((2*e*x)/d + 1))/(d*e^2)
```

3.49 $\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx$

3.49.1 Optimal result

Integrand size = 18, antiderivative size = 76

$$\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx=\frac{bn}{2de(d+ex)}+\frac{bn\log(x)}{2d^2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}-\frac{bn\log(d+ex)}{2d^2e}$$

output
```
1/2*b*n/d/e/(e*x+d)+1/2*b*n*ln(x)/d^2/e+1/2*(-a-b*ln(c*x^n))/e/(e*x+d)^2-1
/2*b*n*ln(e*x+d)/d^2/e
```

3.49.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.70

$$\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx=\frac{-\frac{a+b\log(cx^n)}{(d+ex)^2}+\frac{bn\left(\frac{d}{d+ex}+\log(x)-\log(d+ex)\right)}{d^2}}{2e}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x)^3,x]
```

output
```
(-((a + b*Log[c*x^n])/(d + e*x)^2) + (b*n*(d/(d + e*x) + Log[x] - Log[d +
e*x]))/d^2)/(2*e)
```

3.49.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 63, normalized size of antiderivative = 0.83, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {2756, 54, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex)^3}dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{bn\int \frac{1}{x(d+ex)^2}dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}$$

$$\Big\downarrow \text{54}$$

$$\frac{bn\int \left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{1}{d^2x}\right)dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x)^3,x]
```

output
```
-1/2*(a + b*Log[c*x^n])/(e*(d + e*x)^2) + (b*n*(1/(d*(d + e*x)) + Log[x]/d
^2 - Log[d + e*x]/d^2))/(2*e)
```

3.49.3.1 Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

3.49.4 Maple [A] (verified)

Time = 0.62 (sec) , antiderivative size = 132, normalized size of antiderivative = 1.74

method	result
parallelrisch	$\frac{2\ln(x)x^2b\,e^3n-2\ln(ex+d)x^2b\,e^3n+4\ln(x)xbd\,e^2n-4\ln(ex+d)xbd\,e^2n-b\,e^3n\,x^2+2\ln(x)b\,d^2en-2\ln(ex+d)b\,d^2en-2b\ln(c\,x^n}{4e^2d^2(ex+d)^2}$
risch	$-\frac{b\ln(x^n)}{2e(ex+d)^2}-\frac{-i\pi b\,d^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)+i\pi b\,d^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2+i\pi b\,d^2\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2-i\pi b\,d^2\,\mathrm{c}}{}$

input
```
int((a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
1/4*(2*ln(x)*x^2*b*e^3*n-2*ln(e*x+d)*x^2*b*e^3*n+4*ln(x)*x*b*d*e^2*n-4*ln(
e*x+d)*x*b*d*e^2*n-b*e^3*n*x^2+2*ln(x)*b*d^2*e*n-2*ln(e*x+d)*b*d^2*e*n-2*b
*ln(c*x^n)*d^2*e+e*d^2*b*n-2*e*d^2*a)/e^2/d^2/(e*x+d)^2
```

3.49.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 107, normalized size of antiderivative = 1.41

$$\int \frac{a+b\log(cx^n)}{(d+ex)^3}\,dx = \frac{bdenx+bd^2n-bd^2\log(c)-ad^2-(be^2nx^2+2\,bdenx+bd^2n)\log(ex+d)+(be^2nx^2+2\,bdenx)\log(x)}{2\left(d^2e^3x^2+2\,d^3e^2x+d^4e\right)}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

output
```
1/2*(b*d*e*n*x + b*d^2*n - b*d^2*log(c) - a*d^2 - (b*e^2*n*x^2 + 2*b*d*e*n
*x + b*d^2*n)*log(e*x + d) + (b*e^2*n*x^2 + 2*b*d*e*n*x)*log(x))/(d^2*e^3*
x^2 + 2*d^3*e^2*x + d^4*e)
```

3.49.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 415 vs. 2(66) = 132.

Time = 1.88 (sec) , antiderivative size = 415, normalized size of antiderivative = 5.46

$$\int \frac{a + b\log(cx^n)}{(d+ex)^3}\,dx = \begin{cases} \tilde{\infty}\left(-\frac{a}{2x^2} - \frac{bn}{4x^2} - \frac{b\log(cx^n)}{2x^2}\right) \\ \frac{ax - bnx + bx\log(cx^n)}{d^3} \\ \frac{-\frac{a}{2x^2} - \frac{bn}{4x^2} - \frac{b\log(cx^n)}{2x^2}}{e^3} \\ -\frac{ad^2}{2d^4e+4d^3e^2x+2d^2e^3x^2} - \frac{bd^2n\log\left(\frac{d}{e}+x\right)}{2d^4e+4d^3e^2x+2d^2e^3x^2} + \frac{bd^2n}{2d^4e+4d^3e^2x+2d^2e^3x^2} - \frac{2bdenx\log\left(\frac{d}{e}+x\right)}{2d^4e+4d^3e^2x+2d^2e^3x^2} + \frac{bdenx}{2d^4e+4d^3e^2x+2d^2e^3x^2} - \end{cases}$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d)**3,x)
```

output
```
Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d
, 0) & Eq(e, 0)), ((a*x - b*n*x + b*x*log(c*x**n))/d**3, Eq(e, 0)), ((-a/(
2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**3, Eq(d, 0)), (-a*d**2
/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*x**2) - b*d**2*n*log(d/e + x)/(2*
d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*x**2) + b*d**2*n/(2*d**4*e + 4*d**3*e
**2*x + 2*d**2*e**3*x**2) - 2*b*d*e*n*x*log(d/e + x)/(2*d**4*e + 4*d**3*e*
*2*x + 2*d**2*e**3*x**2) + b*d*e*n*x/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e*
*3*x**2) + 2*b*d*e*x*log(c*x**n)/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*x
**2) - b*e**2*n*x**2*log(d/e + x)/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*
x**2) + b*e**2*x**2*log(c*x**n)/(2*d**4*e + 4*d**3*e**2*x + 2*d**2*e**3*x*
*2), True))
```

3.49.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 99, normalized size of antiderivative = 1.30

$$\int \frac{a + b\log(cx^n)}{(d+ex)^3}\,dx = \frac{1}{2}bn\left(\frac{1}{de^2x + d^2e} - \frac{\log(ex+d)}{d^2e} + \frac{\log(x)}{d^2e}\right) - \frac{b\log(cx^n)}{2(e^3x^2 + 2de^2x + d^2e)} - \frac{a}{2(e^3x^2 + 2de^2x + d^2e)}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*b*n*(1/(d*e^2*x + d^2*e) - log(e*x + d)/(d^2*e) + log(x)/(d^2*e)) - 1/
2*b*log(c*x^n)/(e^3*x^2 + 2*d*e^2*x + d^2*e) - 1/2*a/(e^3*x^2 + 2*d*e^2*x
+ d^2*e)
```

3.49.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.37

$$\int \frac{a+b\log\left(cx^n\right)}{(d+ex)^3}\,dx = -\frac{bn\log\left(x\right)}{2\left(e^3x^2+2\,de^2x+d^2e\right)}+\frac{benx+bdn-bd\log\left(c\right)-ad}{2\left(de^3x^2+2\,d^2e^2x+d^3e\right)}-\frac{bn\log\left(ex+d\right)}{2\,d^2e}+\frac{bn\log\left(x\right)}{2\,d^2e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

output
```
-1/2*b*n*log(x)/(e^3*x^2 + 2*d*e^2*x + d^2*e) + 1/2*(b*e*n*x + b*d*n - b*d
*log(c) - a*d)/(d*e^3*x^2 + 2*d^2*e^2*x + d^3*e) - 1/2*b*n*log(e*x + d)/(d
^2*e) + 1/2*b*n*log(x)/(d^2*e)
```

3.49.9 Mupad [B] (verification not implemented)

Time = 0.77 (sec) , antiderivative size = 91, normalized size of antiderivative = 1.20

$$\int \frac{a+b\log\left(cx^n\right)}{(d+ex)^3}\,dx = \frac{b\,n-a+\frac{b\,e\,n\,x}{d}}{2\,d^2\,e+4\,d\,e^2\,x+2\,e^3\,x^2}-\frac{b\,\ln\left(c\,x^n\right)}{2\,e\,\left(d^2+2\,d\,e\,x+e^2\,x^2\right)}-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{d^2\,e}$$

input
```
int((a + b*log(c*x^n))/(d + e*x)^3,x)
```

output
```
(b*n - a + (b*e*n*x)/d)/(2*d^2*e + 2*e^3*x^2 + 4*d*e^2*x) - (b*log(c*x^n))
/(2*e*(d^2 + e^2*x^2 + 2*d*e*x)) - (b*n*atanh((2*e*x)/d + 1))/(d^2*e)
```

3.50 $\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx$

3.50.1 Optimal result

Integrand size = 21, antiderivative size = 134

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx = -\frac{bn}{2d^2(d+ex)} - \frac{bn\log(x)}{2d^3} + \frac{a+b\log(cx^n)}{2d(d+ex)^2} - \frac{ex(a+b\log(cx^n))}{d^3(d+ex)} - \frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^3} + \frac{3bn\log(d+ex)}{2d^3} + \frac{bn\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}$$

output
```
-1/2*b*n/d^2/(e*x+d)-1/2*b*n*ln(x)/d^3+1/2*(a+b*ln(c*x^n))/d/(e*x+d)^2-e*x
*(a+b*ln(c*x^n))/d^3/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))/d^3+3/2*b*n*ln(e*
x+d)/d^3+b*n*polylog(2,-d/e/x)/d^3
```

3.50.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.05

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx = \frac{\frac{d^2(a+b\log(cx^n))}{(d+ex)^2} + \frac{2d(a+b\log(cx^n))}{d+ex} + \frac{(a+b\log(cx^n))^2}{bn} - 2bn(\log(x)-\log(d+ex)) + bn\left(-\frac{d}{d+ex} - \log(x) + \log(d + \right.}{2d^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^3),x]
```

output
```
((d^2*(a + b*Log[c*x^n]))/(d + e*x)^2 + (2*d*(a + b*Log[c*x^n]))/(d + e*x)
 + (a + b*Log[c*x^n])^2/(b*n) - 2*b*n*(Log[x] - Log[d + e*x]) + b*n*(-(d/(
d + e*x)) - Log[x] + Log[d + e*x]) - 2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d]
 - 2*b*n*PolyLog[2, -((e*x)/d)])/(2*d^3)
```

3.50.3 Rubi [A] (verified)

Time = 0.68 (sec) , antiderivative size = 168, normalized size of antiderivative = 1.25, number of steps used = 9, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.429$, Rules used = {2789, 2756, 54, 2009, 2789, 2751, 16, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log\left(cx^n\right)}{x(d+ex)^3}dx$$

$$\Big\downarrow \text{ 2789}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^3}dx}{d}$$

$$\Big\downarrow \text{ 2756}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^2}dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{ 54}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{1}{d^2x}\right)dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{ 2789}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{ 2751}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int\frac{1}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \; 16$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \; 2779$$

$$\frac{\frac{\frac{bn\int\frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \; 2838$$

$$\frac{\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x)^3),x]
```

output
```
-((e*(-1/2*(a + b*Log[c*x^n])/(e*(d + e*x)^2) + (b*n*(1/(d*(d + e*x)) + Lo
g[x]/d^2 - Log[d + e*x]/d^2))/(2*e)))/d) + (-((e*((x*(a + b*Log[c*x^n]))/(
d*(d + e*x)) - (b*n*Log[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*(a + b
*Log[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/d)/d)/d
```

3.50. $\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx$

3.50.3.1 Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.50. $\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx$

3.50.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.90 (sec) , antiderivative size = 273, normalized size of antiderivative = 2.04

method	result
risch	$-\frac{b\ln(x^n)\ln(ex+d)}{d^3}+\frac{b\ln(x^n)}{d^2(ex+d)}+\frac{b\ln(x^n)}{2d(ex+d)^2}+\frac{b\ln(x^n)\ln(x)}{d^3}-\frac{bn}{2d^2(ex+d)}+\frac{3bn\ln(ex+d)}{2d^3}-\frac{3bn\ln(x)}{2d^3}-\frac{bn\ln(x)^2}{2d^3}+$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d^3*ln(e*x+d)+b*ln(x^n)/d^2/(e*x+d)+1/2*b*ln(x^n)/d/(e*x+d)^2+b
*ln(x^n)/d^3*ln(x)-1/2*b*n/d^2/(e*x+d)+3/2*b*n*ln(e*x+d)/d^3-3/2*b*n*ln(x)
/d^3-1/2*b*n/d^3*ln(x)^2+b*n/d^3*ln(e*x+d)*ln(-e*x/d)+b*n/d^3*dilog(-e*x/d
)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*cs
gn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x
^n)^3+b*ln(c)+a)*(-1/d^3*ln(e*x+d)+1/d^2/(e*x+d)+1/2/d/(e*x+d)^2+1/d^3*ln(
x))
```

3.50.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^4 + 3*d*e^2*x^3 + 3*d^2*e*x^2 + d^3*x),
 x)
```

3.50.6 Sympy [A] (verification not implemented)

Time = 37.00 (sec) , antiderivative size = 352, normalized size of antiderivative = 2.63

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx = -\frac{ae\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)}{d} - \frac{ae\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{d^2}$$
$$-\frac{ae\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^3} + \frac{a\log(x)}{d^3} + \frac{be^2n\left(\begin{cases}-\frac{1}{e^3x} & \text{for } d=0\\ -\frac{1}{2de^2+2e^3x} - \frac{\log(d+ex)}{2de^2} & \text{otherwise}\end{cases}\right)}{d^2}$$
$$-\frac{be^2\left(\begin{cases}\frac{1}{e^3x} & \text{for } d=0\\ -\frac{1}{2d\left(\frac{d}{x}+e\right)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2}$$
$$-\frac{2ben\left(\begin{cases}-\frac{1}{e^2x} & \text{for } d=0\\ -\frac{\log(d^2+dex)}{de} & \text{otherwise}\end{cases}\right)}{d^2} + \frac{2be\left(\begin{cases}\frac{1}{e^2x} & \text{for } d=0\\ -\frac{1}{\frac{d^2}{x}+de} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2}$$
$$+\frac{bn\left(\begin{cases}-\frac{1}{ex}\\ \frac{\begin{cases}\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(e)\log(x)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{d^2}$$
$$-\frac{b\left(\begin{cases}\frac{1}{ex} & \text{for } d=0\\ \frac{\log\left(\frac{d}{x}+e\right)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2}$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d)**3,x)
```

output
```
-a*e*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d - a*e*
Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**2 - a*e*Piecew
ise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d**3 + a*log(x)/d**3 + b*e**2
*n*Piecewise((-1/(e**3*x), Eq(d, 0)), (-1/(2*d*e**2 + 2*e**3*x) - log(d +
e*x)/(2*d*e**2), True))/d**2 - b*e**2*Piecewise((1/(e**3*x), Eq(d, 0)), (-
1/(2*d*(d/x + e)**2), True))*log(c*x**n)/d**2 - 2*b*e*n*Piecewise((-1/(e**
2*x), Eq(d, 0)), (-log(d**2 + d*e*x)/(d*e), True))/d**2 + 2*b*e*Piecewise(
(1/(e**2*x), Eq(d, 0)), (-1/(d**2/x + d*e), True))*log(c*x**n)/d**2 + b*n*
Piecewise((-1/(e*x), Eq(d, 0)), (Piecewise((polylog(2, d*exp_polar(I*pi)/(
e*x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) + polylog(2, d*exp_p
olar(I*pi)/(e*x)), Abs(x) < 1), (-log(e)*log(1/x) + polylog(2, d*exp_polar
(I*pi)/(e*x)), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log
(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) + polylog(2, d*exp_pol
ar(I*pi)/(e*x)), True))/d, True))/d**2 - b*Piecewise((1/(e*x), Eq(d, 0)),
(log(d/x + e)/d, True))*log(c*x**n)/d**2
```

3.50.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*a*((2*e*x + 3*d)/(d^2*e^2*x^2 + 2*d^3*e*x + d^4) - 2*log(e*x + d)/d^3
+ 2*log(x)/d^3) + b*integrate((log(c) + log(x^n))/(e^3*x^4 + 3*d*e^2*x^3 +
 3*d^2*e*x^2 + d^3*x), x)
```

3.50.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^3*x), x)
```

3.50.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x(d+ex)^3}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,{\left(d+e\,x\right)}^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^3), x)
```

3.51 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx$

3.51.1 Optimal result

Integrand size = 21, antiderivative size = 171

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx = -\frac{bn}{d^3x}+\frac{ben}{2d^3(d+ex)}+\frac{ben\log(x)}{2d^4}-\frac{a+b\log(cx^n)}{d^3x} -\frac{e(a+b\log(cx^n))}{2d^2(d+ex)^2}+\frac{2e^2x(a+b\log(cx^n))}{d^4(d+ex)} +\frac{3e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4} -\frac{5ben\log(d+ex)}{2d^4}-\frac{3ben\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}$$

output
```
-b*n/d^3/x+1/2*b*e*n/d^3/(e*x+d)+1/2*b*e*n*ln(x)/d^4+(-a-b*ln(c*x^n))/d^3/
x-1/2*e*(a+b*ln(c*x^n))/d^2/(e*x+d)^2+2*e^2*x*(a+b*ln(c*x^n))/d^4/(e*x+d)+
3*e*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^4-5/2*b*e*n*ln(e*x+d)/d^4-3*b*e*n*polylo
g(2,-d/e/x)/d^4
```

3.51.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 173, normalized size of antiderivative = 1.01

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx$$
$$= \frac{-\frac{2bdn}{x}-\frac{2d(a+b\log(cx^n))}{x}-\frac{d^2e(a+b\log(cx^n))}{(d+ex)^2}-\frac{4de(a+b\log(cx^n))}{d+ex}-\frac{3e(a+b\log(cx^n))^2}{bn}+4ben(\log(x)-\log(d+ex))+}{2d^4}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^3),x]
```

output
```
((-2*b*d*n)/x - (2*d*(a + b*Log[c*x^n]))/x - (d^2*e*(a + b*Log[c*x^n]))/(d
 + e*x)^2 - (4*d*e*(a + b*Log[c*x^n]))/(d + e*x) - (3*e*(a + b*Log[c*x^n])
^2)/(b*n) + 4*b*e*n*(Log[x] - Log[d + e*x]) + b*e*n*(d/(d + e*x) + Log[x]
- Log[d + e*x]) + 6*e*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 6*b*e*n*PolyLo
g[2, -((e*x)/d)])/(2*d^4)
```

3.51.3 Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 171, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx$$
$$\Big\downarrow \text{2793}$$
$$\int \left(\frac{2e^2(a+b\log(cx^n))}{d^3(d+ex)^2}-\frac{3e(a+b\log(cx^n))}{d^3x(d+ex)}+\frac{a+b\log(cx^n)}{d^3x^2}+\frac{e^2(a+b\log(cx^n))}{d^2(d+ex)^3}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{2e^2x(a+b\log(cx^n))}{d^4(d+ex)}+\frac{3e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^4}-\frac{a+b\log(cx^n)}{d^3x}-\frac{e(a+b\log(cx^n))}{2d^2(d+ex)^2}-\frac{3ben\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}+\frac{ben\log(x)}{2d^4}-\frac{5ben\log(d+ex)}{2d^4}+\frac{ben}{2d^3(d+ex)}-\frac{bn}{d^3x}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^3),x]
```

output
```
-((b*n)/(d^3*x)) + (b*e*n)/(2*d^3*(d + e*x)) + (b*e*n*Log[x])/(2*d^4) - (a
 + b*Log[c*x^n])/(d^3*x) - (e*(a + b*Log[c*x^n]))/(2*d^2*(d + e*x)^2) + (2
*e^2*x*(a + b*Log[c*x^n]))/(d^4*(d + e*x)) + (3*e*Log[1 + d/(e*x)]*(a + b*
Log[c*x^n]))/d^4 - (5*b*e*n*Log[d + e*x])/(2*d^4) - (3*b*e*n*PolyLog[2, -(
d/(e*x))])/d^4
```

3.51.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.51.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.56 (sec) , antiderivative size = 324, normalized size of antiderivative = 1.89

method	result
risch	$-\frac{b\ln(x^n)e}{2d^2(ex+d)^2}+\frac{3b\ln(x^n)e\ln(ex+d)}{d^4}-\frac{2b\ln(x^n)e}{d^3(ex+d)}-\frac{b\ln(x^n)}{d^3x}-\frac{3b\ln(x^n)e\ln(x)}{d^4}+\frac{3bne\ln(x)^2}{2d^4}-\frac{3bne\ln(ex+d)\ln(-\frac{ex}{d})}{d^4}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)/d^2/(e*x+d)^2*e+3*b*ln(x^n)/d^4*e*ln(e*x+d)-2*b*ln(x^n)/d^3
*e/(e*x+d)-b*ln(x^n)/d^3/x-3*b*ln(x^n)/d^4*e*ln(x)+3/2*b*n/d^4*e*ln(x)^2-3
*b*n/d^4*e*ln(e*x+d)*ln(-e*x/d)-3*b*n/d^4*e*dilog(-e*x/d)+1/2*b*e*n/d^3/(e
*x+d)-5/2*b*e*n*ln(e*x+d)/d^4-b*n/d^3/x+5/2*b*e*n*ln(x)/d^4+(-1/2*I*b*Pi*c
sgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/
2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)
*(-1/2/d^2/(e*x+d)^2*e+3/d^4*e*ln(e*x+d)-2/d^3*e/(e*x+d)-1/d^3/x-3/d^4*e*l
n(x))
```

3.51.5 Fricas [F]

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex)^3}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)^3x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^5 + 3*d*e^2*x^4 + 3*d^2*e*x^3 + d^3*x^2
), x)
```

3.51.6 Sympy [A] (verification not implemented)

Time = 38.43 (sec) , antiderivative size = 444, normalized size of antiderivative = 2.60

$$
\begin{aligned}
\int \frac{a+b\log\left(cx^{n}\right)}{x^{2}(d+ex)^{3}}\,dx &= \frac{ae^{2}\left(\begin{cases}\frac{x}{d^{3}} & \text{for}\: e=0\\-\frac{1}{2e(d+ex)^{2}} & \text{otherwise}\end{cases}\right)}{d^{2}} \\
&+ \frac{2ae^{2}\left(\begin{cases}\frac{x}{d^{2}} & \text{for}\: e=0\\-\frac{1}{de+e^{2}x} & \text{otherwise}\end{cases}\right)}{d^{3}} - \frac{a}{d^{3}x} + \frac{3ae^{2}\left(\begin{cases}\frac{x}{d} & \text{for}\: e=0\\\frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^{4}} \\
&- \frac{3ae\log(x)}{d^{4}} - \frac{be^{2}n\left(\begin{cases}\frac{x}{d^{3}} & \text{for}\: e=0\\-\frac{1}{2d^{2}e+2de^{2}x}-\frac{\log(x)}{2d^{2}e}+\frac{\log\left(\frac{d}{e}+x\right)}{2d^{2}e} & \text{otherwise}\end{cases}\right)}{d^{2}} \\
&+ \frac{be^{2}\left(\begin{cases}\frac{x}{d^{3}} & \text{for}\: e=0\\-\frac{1}{2e(d+ex)^{2}} & \text{otherwise}\end{cases}\right)\log\left(cx^{n}\right)}{d^{2}} - \frac{2be^{2}n\left(\begin{cases}\frac{x}{d^{2}} & \text{for}\: e=0\\-\frac{\log(x)}{de}+\frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{d^{3}} \\
&+ \frac{2be^{2}\left(\begin{cases}\frac{x}{d^{2}} & \text{for}\: e=0\\-\frac{1}{de+e^{2}x} & \text{otherwise}\end{cases}\right)\log\left(cx^{n}\right)}{d^{3}} - \frac{bn}{d^{3}x} - \frac{b\log\left(cx^{n}\right)}{d^{3}x} \\
&- \frac{3be^{2}n\left(\begin{cases}\frac{x}{d} \\ \frac{\begin{cases}-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{|x|}<1\wedge|x|< \\ \log(d)\log(x)-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{d^{4}} \\
&+ \frac{3be^{2}\left(\begin{cases}\frac{x}{d} & \text{for}\: e=0\\\frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)\log\left(cx^{n}\right)}{d^{4}} + \frac{3ben\log(x)^{2}}{2d^{4}} - \frac{3be\log(x)\log\left(cx^{n}\right)}{d^{4}}
\end{aligned}
$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**3,x)
```

output
```
a*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**2 +
 2*a*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**3 -
a/(d**3*x) + 3*a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d
**4 - 3*a*e*log(x)/d**4 - b*e**2*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d*
*2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/d
**2 + b*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*
log(c*x**n)/d**2 - 2*b*e**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e)
 + log(d/e + x)/(d*e), True))/d**3 + 2*b*e**2*Piecewise((x/d**2, Eq(e, 0))
, (-1/(d*e + e**2*x), True))*log(c*x**n)/d**3 - b*n/(d**3*x) - b*log(c*x**
n)/(d**3*x) - 3*b*e**2*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2
, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) -
 polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polyl
og(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0,
0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polyl
og(2, e*x*exp_polar(I*pi)/d), True))/e, True))/d**4 + 3*b*e**2*Piecewise((
x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/d**4 + 3*b*e*n*log(x)*
*2/(2*d**4) - 3*b*e*log(x)*log(c*x**n)/d**4
```

3.51.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^3x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
-1/2*a*((6*e^2*x^2 + 9*d*e*x + 2*d^2)/(d^3*e^2*x^3 + 2*d^4*e*x^2 + d^5*x)
- 6*e*log(e*x + d)/d^4 + 6*e*log(x)/d^4) + b*integrate((log(c) + log(x^n))
/(e^3*x^5 + 3*d*e^2*x^4 + 3*d^2*e*x^3 + d^3*x^2), x)
```

3.51.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^3x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^3*x^2), x)
```

3.51.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^3}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^3), x)
```

3.52 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx$

3.52.1 Optimal result

Integrand size = 21, antiderivative size = 217

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx = &-\frac{bn}{4d^3x^2}+\frac{3ben}{d^4x}-\frac{be^2n}{2d^4(d+ex)}-\frac{be^2n\log(x)}{2d^5}\\ &-\frac{a+b\log(cx^n)}{2d^3x^2}+\frac{3e(a+b\log(cx^n))}{d^4x}+\frac{e^2(a+b\log(cx^n))}{2d^3(d+ex)^2}\\ &-\frac{3e^3x(a+b\log(cx^n))}{d^5(d+ex)}-\frac{6e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^5}\\ &+\frac{7be^2n\log(d+ex)}{2d^5}+\frac{6be^2n\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^5}\end{aligned}$$

output

```
-1/4*b*n/d^3/x^2+3*b*e*n/d^4/x-1/2*b*e^2*n/d^4/(e*x+d)-1/2*b*e^2*n*ln(x)/d
^5+1/2*(-a-b*ln(c*x^n))/d^3/x^2+3*e*(a+b*ln(c*x^n))/d^4/x+1/2*e^2*(a+b*ln(
c*x^n))/d^3/(e*x+d)^2-3*e^3*x*(a+b*ln(c*x^n))/d^5/(e*x+d)-6*e^2*ln(1+d/e/x
)*(a+b*ln(c*x^n))/d^5+7/2*b*e^2*n*ln(e*x+d)/d^5+6*b*e^2*n*polylog(2,-d/e/x
)/d^5
```

3.52.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 227, normalized size of antiderivative = 1.05

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx = -\frac{\frac{bd^2n}{x^2}-\frac{12bden}{x}+\frac{2d^2(a+b\log(cx^n))}{x^2}-\frac{12de(a+b\log(cx^n))}{x}-\frac{2d^2e^2(a+b\log(cx^n))}{(d+ex)^2}-\frac{12de^2(a+b\log(cx^n))}{d+ex}-\frac{12e^2(a+b\log(cx^n))^2}{bn}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)^3),x]
```

output
```
-1/4*((b*d^2*n)/x^2 - (12*b*d*e*n)/x + (2*d^2*(a + b*Log[c*x^n]))/x^2 - (1
2*d*e*(a + b*Log[c*x^n]))/x - (2*d^2*e^2*(a + b*Log[c*x^n]))/(d + e*x)^2 -
 (12*d*e^2*(a + b*Log[c*x^n]))/(d + e*x) - (12*e^2*(a + b*Log[c*x^n])^2)/(
b*n) + 12*b*e^2*n*(Log[x] - Log[d + e*x]) + (2*b*e^2*n*(d + (d + e*x)*Log[
x] - (d + e*x)*Log[d + e*x]))/(d + e*x) + 24*e^2*(a + b*Log[c*x^n])*Log[1
+ (e*x)/d] + 24*b*e^2*n*PolyLog[2, -((e*x)/d)])/d^5
```

3.52.3 Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 217, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(-\frac{3e^3(a+b\log(cx^n))}{d^4(d+ex)^2}+\frac{6e^2(a+b\log(cx^n))}{d^4x(d+ex)}-\frac{3e(a+b\log(cx^n))}{d^4x^2}-\frac{e^3(a+b\log(cx^n))}{d^3(d+ex)^3}+\frac{a+b\log(cx^n)}{d^3x^3}\right)d$$

$$\Big\downarrow \text{2009}$$

$$-\frac{3e^3x(a+b\log(cx^n))}{d^5(d+ex)}-\frac{6e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^5}+\frac{3e(a+b\log(cx^n))}{d^4x}+\frac{e^2(a+b\log(cx^n))}{2d^3(d+ex)^2}-\frac{a+b\log(cx^n)}{2d^3x^2}+\frac{6be^2n\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^5}-\frac{be^2n\log(x)}{2d^5}+\frac{7be^2n\log(d+ex)}{2d^5}-\frac{be^2n}{2d^4(d+ex)}+\frac{3ben}{d^4x}-\frac{bn}{4d^3x^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)^3),x]
```

output
```
-1/4*(b*n)/(d^3*x^2) + (3*b*e*n)/(d^4*x) - (b*e^2*n)/(2*d^4*(d + e*x)) - (
b*e^2*n*Log[x])/(2*d^5) - (a + b*Log[c*x^n])/(2*d^3*x^2) + (3*e*(a + b*Log
[c*x^n]))/(d^4*x) + (e^2*(a + b*Log[c*x^n]))/(2*d^3*(d + e*x)^2) - (3*e^3*
x*(a + b*Log[c*x^n]))/(d^5*(d + e*x)) - (6*e^2*Log[1 + d/(e*x)]*(a + b*Log
[c*x^n]))/d^5 + (7*b*e^2*n*Log[d + e*x])/(2*d^5) + (6*b*e^2*n*PolyLog[2, -
(d/(e*x))])/d^5
```

3.52.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.52.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.68 (sec) , antiderivative size = 386, normalized size of antiderivative = 1.78

method	result
risch	$-\frac{6b\ln(x^n)e^2\ln(ex+d)}{d^5}+\frac{3b\ln(x^n)e^2}{d^4(ex+d)}+\frac{b\ln(x^n)e^2}{2d^3(ex+d)^2}-\frac{b\ln(x^n)}{2d^3x^2}+\frac{6b\ln(x^n)e^2\ln(x)}{d^5}+\frac{3b\ln(x^n)e}{d^4x}-\frac{b\,e^2n}{2d^4(ex+d)}+\frac{7b\,e^2n}{}$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-6*b*ln(x^n)/d^5*e^2*ln(e*x+d)+3*b*ln(x^n)/d^4*e^2/(e*x+d)+1/2*b*ln(x^n)/d
^3*e^2/(e*x+d)^2-1/2*b*ln(x^n)/d^3/x^2+6*b*ln(x^n)/d^5*e^2*ln(x)+3*b*ln(x^
n)/d^4*e/x-1/2*b*e^2*n/d^4/(e*x+d)+7/2*b*e^2*n*ln(e*x+d)/d^5-1/4*b*n/d^3/x
^2+3*b*e*n/d^4/x-7/2*b*e^2*n*ln(x)/d^5-3*b*n/d^5*e^2*ln(x)^2+6*b*n/d^5*e^2
*ln(e*x+d)*ln(-e*x/d)+6*b*n/d^5*e^2*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-6/d^5*e
^2*ln(e*x+d)+3/d^4*e^2/(e*x+d)+1/2/d^3*e^2/(e*x+d)^2-1/2/d^3/x^2+6/d^5*e^2
*ln(x)+3/d^4*e/x)
```

3.52.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^3x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^6 + 3*d*e^2*x^5 + 3*d^2*e*x^4 + d^3*x^3
), x)
```

3.52.6 Sympy [A] (verification not implemented)

Time = 41.53 (sec) , antiderivative size = 496, normalized size of antiderivative = 2.29

$$
\begin{aligned}
\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}(d+ex)^{3}}\,dx = &-\frac{ae^{3}\left(\begin{cases}\frac{x}{d^{3}} & \text{for}\: e = 0\\-\frac{1}{2e(d+ex)^{2}} & \text{otherwise}\end{cases}\right)}{d^{3}}-\frac{a}{2d^{3}x^{2}}\\
&-\frac{3ae^{3}\left(\begin{cases}\frac{x}{d^{2}} & \text{for}\: e = 0\\-\frac{1}{de+e^{2}x} & \text{otherwise}\end{cases}\right)}{d^{4}}+\frac{3ae}{d^{4}x}-\frac{6ae^{3}\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\\frac{\log\left(d+ex\right)}{e} & \text{otherwise}\end{cases}\right)}{d^{5}}\\
&+\frac{6ae^{2}\log\left(x\right)}{d^{5}}+\frac{be^{3}n\left(\begin{cases}\frac{x}{d^{3}} & \text{for}\: e = 0\\-\frac{1}{2d^{2}e+2de^{2}x}-\frac{\log\left(x\right)}{2d^{2}e}+\frac{\log\left(\frac{d}{e}+x\right)}{2d^{2}e} & \text{otherwise}\end{cases}\right)}{d^{3}}\\
&-\frac{be^{3}\left(\begin{cases}\frac{x}{d^{3}} & \text{for}\: e = 0\\-\frac{1}{2e(d+ex)^{2}} & \text{otherwise}\end{cases}\right)\log\left(cx^{n}\right)}{d^{3}}-\frac{bn}{4d^{3}x^{2}}\\
&-\frac{b\log\left(cx^{n}\right)}{2d^{3}x^{2}}+\frac{3be^{3}n\left(\begin{cases}\frac{x}{d^{2}} & \text{for}\: e = 0\\-\frac{\log\left(x\right)}{de}+\frac{\log\left(\frac{d}{e}+x\right)}{de} & \text{otherwise}\end{cases}\right)}{d^{4}}\\
&-\frac{3be^{3}\left(\begin{cases}\frac{x}{d^{2}} & \text{for}\: e = 0\\-\frac{1}{de+e^{2}x} & \text{otherwise}\end{cases}\right)\log\left(cx^{n}\right)}{d^{4}}+\frac{3ben}{d^{4}x}+\frac{3be\log\left(cx^{n}\right)}{d^{4}x}\\
&+\frac{6be^{3}n\left(\begin{cases}\frac{x}{d}\\\frac{\begin{cases}-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{\left|x\right|} < 1 \wedge \left|x\right| <\\\log\left(d\right)\log\left(x\right)-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \left|x\right| < 1\\-\log\left(d\right)\log\left(\frac{1}{x}\right)-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{for}\: \frac{1}{\left|x\right|} < 1\\-G_{2,2}^{2,0}\left(\begin{matrix} & 1, 1 \\0, 0 & \end{matrix}\middle|{x}\right)\log\left(d\right)+G_{2,2}^{0,2}\left(\begin{matrix}1, 1 & \\ & 0, 0\end{matrix}\middle|{x}\right)\log\left(d\right)-\operatorname{Li}_{2}\left(\frac{exe^{i\pi}}{d}\right) & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{d^{5}}\\
&-\frac{6be^{3}\left(\begin{cases}\frac{x}{d} & \text{for}\: e = 0\\\frac{\log\left(d+ex\right)}{e} & \text{otherwise}\end{cases}\right)\log\left(cx^{n}\right)}{d^{5}}-\frac{3be^{2}n\log\left(x\right)^{2}}{d^{5}}+\frac{6be^{2}\log\left(x\right)\log\left(cx^{n}\right)}{d^{5}}
\end{aligned}
$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**3,x)
```

output
```
-a*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**3
- a/(2*d**3*x**2) - 3*a*e**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2
*x), True))/d**4 + 3*a*e/(d**4*x) - 6*a*e**3*Piecewise((x/d, Eq(e, 0)), (l
og(d + e*x)/e, True))/d**5 + 6*a*e**2*log(x)/d**5 + b*e**3*n*Piecewise((x/
d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e
 + x)/(2*d**2*e), True))/d**3 - b*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(
2*e*(d + e*x)**2), True))*log(c*x**n)/d**3 - b*n/(4*d**3*x**2) - b*log(c*x
**n)/(2*d**3*x**2) + 3*b*e**3*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*
e) + log(d/e + x)/(d*e), True))/d**4 - 3*b*e**3*Piecewise((x/d**2, Eq(e, 0
)), (-1/(d*e + e**2*x), True))*log(c*x**n)/d**4 + 3*b*e*n/(d**4*x) + 3*b*e
*log(c*x**n)/(d**4*x) + 6*b*e**3*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((
-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d
)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/
x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1,
1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(
d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/d**5 - 6*b*e**3*P
iecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/d**5 - 3*b*e
**2*n*log(x)**2/d**5 + 6*b*e**2*log(x)*log(c*x**n)/d**5
```

3.52.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^3x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*a*((12*e^3*x^3 + 18*d*e^2*x^2 + 4*d^2*e*x - d^3)/(d^4*e^2*x^4 + 2*d^5*
e*x^3 + d^6*x^2) - 12*e^2*log(e*x + d)/d^5 + 12*e^2*log(x)/d^5) + b*integr
ate((log(c) + log(x^n))/(e^3*x^6 + 3*d*e^2*x^5 + 3*d^2*e*x^4 + d^3*x^3), x
)
```

3.52.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^3x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^3*x^3), x)
```

3.52.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^3}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^3\,(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^3), x)
```

3.53 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx$

3.53.1 Optimal result

Integrand size = 21, antiderivative size = 229

$$\begin{aligned}\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx = {} & \frac{10bdnx}{e^5}-\frac{d(60a+47bn)x}{6e^5}-\frac{5bnx^2}{2e^4} \\ & -\frac{10bdx\log(cx^n)}{e^5}-\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3} \\ & -\frac{x^4(5a+bn+5b\log(cx^n))}{6e^2(d+ex)^2}-\frac{x^3(20a+9bn+20b\log(cx^n))}{6e^3(d+ex)} \\ & +\frac{x^2(60a+47bn+60b\log(cx^n))}{12e^4} \\ & +\frac{d^2(60a+47bn+60b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{6e^6} \\ & +\frac{10bd^2n\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^6}\end{aligned}$$

output
```
10*b*d*n*x/e^5-1/6*d*(47*b*n+60*a)*x/e^5-5/2*b*n*x^2/e^4-10*b*d*x*ln(c*x^n
)/e^5-1/3*x^5*(a+b*ln(c*x^n))/e/(e*x+d)^3-1/6*x^4*(5*a+b*n+5*b*ln(c*x^n))/
e^2/(e*x+d)^2-1/6*x^3*(20*a+9*b*n+20*b*ln(c*x^n))/e^3/(e*x+d)+1/12*x^2*(60
*a+47*b*n+60*b*ln(c*x^n))/e^4+1/6*d^2*(60*a+47*b*n+60*b*ln(c*x^n))*ln(1+e*
x/d)/e^6+10*b*d^2*n*polylog(2,-e*x/d)/e^6
```

3.53.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 249, normalized size of antiderivative = 1.09

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx$$
$$= \frac{-48adex+48bdenx-3be^2nx^2-48bdex\log(cx^n)+6e^2x^2(a+b\log(cx^n))+\frac{4d^5(a+b\log(cx^n))}{(d+ex)^3}-\frac{30d^4(a+b\log(}{(d+ex)^2}}{}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
(-48*a*d*e*x + 48*b*d*e*n*x - 3*b*e^2*n*x^2 - 48*b*d*e*x*Log[c*x^n] + 6*e^
2*x^2*(a + b*Log[c*x^n]) + (4*d^5*(a + b*Log[c*x^n]))/(d + e*x)^3 - (30*d^
4*(a + b*Log[c*x^n]))/(d + e*x)^2 + (120*d^3*(a + b*Log[c*x^n]))/(d + e*x)
 - 2*b*d^2*n*((d*(3*d + 2*e*x))/(d + e*x)^2 + 2*Log[x] - 2*Log[d + e*x]) -
 120*b*d^2*n*(Log[x] - Log[d + e*x]) + 30*b*d^2*n*(d/(d + e*x) + Log[x] -
Log[d + e*x]) + 120*d^2*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] + 120*b*d^2*n*
PolyLog[2, -((e*x)/d)])/(12*e^6)
```

3.53.3 Rubi [A] (verified)

Time = 0.70 (sec) , antiderivative size = 241, normalized size of antiderivative = 1.05, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {2784, 2784, 2784, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx$$
$$\Big\downarrow \text{2784}$$
$$\frac{\int \frac{x^4(5a+bn+5b\log(cx^n))}{(d+ex)^3}dx}{3e}-\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3}$$
$$\Big\downarrow \text{2784}$$
$$\frac{\frac{\int \frac{x^3(20a+9bn+20b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^4(5a+5b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3}$$
$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\frac{\int \frac{x^2(60a+47bn+60b\log(cx^n))}{d+ex}dx}{e}-\frac{x^3(20a+20b\log(cx^n)+9bn)}{e(d+ex)}}{2e}-\frac{x^4(5a+5b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3}$$

$\downarrow$ 2793

$$\frac{\frac{\frac{\int \left(\frac{(60a+47bn+60b\log(cx^n))d^2}{e^2(d+ex)}-\frac{(60a+47bn+60b\log(cx^n))d}{e^2}+\frac{x(60a+47bn+60b\log(cx^n))}{e}\right)dx}{e}-\frac{x^3(20a+20b\log(cx^n)+9bn)}{e(d+ex)}}{2e}-\frac{x^4(5a+5b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-$$
$$\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3}$$

$\downarrow$ 2009

$$\frac{\frac{\frac{d^2\log\left(\frac{ex}{d}+1\right)(60a+60b\log(cx^n)+47bn)}{e^3}+\frac{x^2(60a+60b\log(cx^n)+47bn)}{2e}-\frac{dx(60a+47bn)}{e^2}-\frac{60bdx\log(cx^n)}{e^2}+\frac{60bd^2n\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{60bdnx}{e^2}-\frac{15bnx^2}{e}}{e}-\frac{x^3(20}{}}{2e}}{3e}$$
$$\frac{x^5(a+b\log(cx^n))}{3e(d+ex)^3}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
-1/3*(x^5*(a + b*Log[c*x^n]))/(e*(d + e*x)^3) + (-1/2*(x^4*(5*a + b*n + 5*
b*Log[c*x^n]))/(e*(d + e*x)^2) + (-((x^3*(20*a + 9*b*n + 20*b*Log[c*x^n]))
/(e*(d + e*x))) + ((60*b*d*n*x)/e^2 - (d*(60*a + 47*b*n)*x)/e^2 - (15*b*n*
x^2)/e - (60*b*d*x*Log[c*x^n])/e^2 + (x^2*(60*a + 47*b*n + 60*b*Log[c*x^n]
))/(2*e) + (d^2*(60*a + 47*b*n + 60*b*Log[c*x^n])*Log[1 + (e*x)/d])/e^3 +
(60*b*d^2*n*PolyLog[2, -((e*x)/d)])/e^3)/e)/(2*e))/(3*e)
```

3.53.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.53.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.56 (sec) , antiderivative size = 405, normalized size of antiderivative = 1.77

method	result
risch	$\frac{b\ln(x^n)x^2}{2e^4} - \frac{4b\ln(x^n)dx}{e^5} + \frac{b\ln(x^n)d^5}{3e^6(ex+d)^3} + \frac{10b\ln(x^n)d^2\ln(ex+d)}{e^6} + \frac{10b\ln(x^n)d^3}{e^6(ex+d)} - \frac{5b\ln(x^n)d^4}{2e^6(ex+d)^2} - \frac{bn\,x^2}{4e^4} + \frac{4bdnx}{e^5} + 17$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e^4*x^2-4*b*ln(x^n)/e^5*d*x+1/3*b*ln(x^n)*d^5/e^6/(e*x+d)^3+
10*b*ln(x^n)/e^6*d^2*ln(e*x+d)+10*b*ln(x^n)/e^6*d^3/(e*x+d)-5/2*b*ln(x^n)/
e^6*d^4/(e*x+d)^2-1/4*b*n*x^2/e^4+4*b*d*n*x/e^5+17/4*b*n/e^6*d^2+47/6*b*n/
e^6*d^2*ln(e*x+d)+13/6*b*n/e^6*d^3/(e*x+d)-1/6*b*n/e^6*d^4/(e*x+d)^2-47/6*
b*n/e^6*d^2*ln(e*x)-10*b*n/e^6*d^2*ln(e*x+d)*ln(-e*x/d)-10*b*n/e^6*d^2*dil
og(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csg
n(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*c
sgn(I*c*x^n)^3+b*ln(c)+a)*(1/e^5*(1/2*e*x^2-4*d*x)+1/3*d^5/e^6/(e*x+d)^3+1
0/e^6*d^2*ln(e*x+d)+10/e^6*d^3/(e*x+d)-5/2/e^6*d^4/(e*x+d)^2)
```

3.53.5 Fricas [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex+d)^4}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b*x^5*log(c*x^n) + a*x^5)/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2
 + 4*d^3*e*x + d^4), x)
```

3.53.6 Sympy [A] (verification not implemented)

Time = 62.66 (sec) , antiderivative size = 617, normalized size of antiderivative = 2.69

$$\int \frac{x^5(a+b\log{(cx^n)})}{(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

output
```
-a*d**5*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/e**5
+ 5*a*d**4*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e*
*5 - 10*a*d**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e*
*5 + 10*a*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**5 - 4
*a*d*x/e**5 + a*x**2/(2*e**4) + b*d**5*n*Piecewise((x/d**4, Eq(e, 0)), (-3
*d/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - 2*e*x/(6*d**4*e + 12*d
**3*e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e) + log(d/e + x)/(3*d**3*
e), True))/e**5 - b*d**5*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)*
*3), True))*log(c*x**n)/e**5 - 5*b*d**4*n*Piecewise((x/d**3, Eq(e, 0)), (-
1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), T
rue))/e**5 + 5*b*d**4*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2)
, True))*log(c*x**n)/e**5 + 10*b*d**3*n*Piecewise((x/d**2, Eq(e, 0)), (-lo
g(x)/(d*e) + log(d/e + x)/(d*e), True))/e**5 - 10*b*d**3*Piecewise((x/d**2
, Eq(e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/e**5 - 10*b*d**2*n*Pie
cewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (A
bs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*
pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d)
, 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg
(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_polar(I*pi)/d)
, True))/e, True))/e**5 + 10*b*d**2*Piecewise((x/d, Eq(e, 0)), (log(d +...
```

3.53.7 Maxima [F]

$$\int \frac{x^5(a+b\log{(cx^n)})}{(d+ex)^4}\,dx = \int \frac{(b\log{(cx^n)}+a)x^5}{(ex+d)^4}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*a*((60*d^3*e^2*x^2 + 105*d^4*e*x + 47*d^5)/(e^9*x^3 + 3*d*e^8*x^2 + 3*
d^2*e^7*x + d^3*e^6) + 60*d^2*log(e*x + d)/e^6 + 3*(e*x^2 - 8*d*x)/e^5) +
b*integrate((x^5*log(c) + x^5*log(x^n))/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2
*x^2 + 4*d^3*e*x + d^4), x)
```

3.53.8 Giac [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx=\int \frac{(b\log(cx^n)+a)x^5}{(ex+d)^4}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/(e*x + d)^4, x)
```

3.53.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^4}\,dx=\int \frac{x^5\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^4}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x)^4, x)
```

3.54 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4} dx$

3.54.1 Optimal result

Integrand size = 21, antiderivative size = 183

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4} dx = -\frac{4bnx}{e^4}+\frac{(12a+13bn)x}{3e^4}+\frac{4bx\log(cx^n)}{e^4}-\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3} -\frac{x^3(4a+bn+4b\log(cx^n))}{6e^2(d+ex)^2}-\frac{x^2(12a+7bn+12b\log(cx^n))}{6e^3(d+ex)} -\frac{d(12a+13bn+12b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3e^5} -\frac{4bdn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^5}$$

output
```
-4*b*n*x/e^4+1/3*(13*b*n+12*a)*x/e^4+4*b*x*ln(c*x^n)/e^4-1/3*x^4*(a+b*ln(c
*x^n))/e/(e*x+d)^3-1/6*x^3*(4*a+b*n+4*b*ln(c*x^n))/e^2/(e*x+d)^2-1/6*x^2*(
12*a+7*b*n+12*b*ln(c*x^n))/e^3/(e*x+d)-1/3*d*(12*a+13*b*n+12*b*ln(c*x^n))*
ln(1+e*x/d)/e^5-4*b*d*n*polylog(2,-e*x/d)/e^5
```

3.54.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 207, normalized size of antiderivative = 1.13

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx$$
$$= \frac{6aex-6benx+6bex\log(cx^n)-\frac{2d^4(a+b\log(cx^n))}{(d+ex)^3}+\frac{12d^3(a+b\log(cx^n))}{(d+ex)^2}-\frac{36d^2(a+b\log(cx^n))}{d+ex}+bdn\left(\frac{d(3d+2ex)}{(d+ex)^2}+2\,\mathrm{lo}\right.}{}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
(6*a*e*x - 6*b*e*n*x + 6*b*e*x*Log[c*x^n] - (2*d^4*(a + b*Log[c*x^n]))/(d
+ e*x)^3 + (12*d^3*(a + b*Log[c*x^n]))/(d + e*x)^2 - (36*d^2*(a + b*Log[c*
x^n]))/(d + e*x) + b*d*n*((d*(3*d + 2*e*x))/(d + e*x)^2 + 2*Log[x] - 2*Log
[d + e*x]) + 36*b*d*n*(Log[x] - Log[d + e*x]) - 12*b*d*n*(d/(d + e*x) + Lo
g[x] - Log[d + e*x]) - 24*d*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 24*b*d*n
*PolyLog[2, -((e*x)/d)])/(6*e^5)
```

3.54.3 Rubi [A] (verified)

Time = 0.64 (sec) , antiderivative size = 198, normalized size of antiderivative = 1.08, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286, Rules used = {2784, 2784, 2784, 27, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx$$

$$\Big\downarrow \; 2784$$

$$\frac{\int \frac{x^3(4a+bn+4b\log(cx^n))}{(d+ex)^3}dx}{3e}-\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \; 2784$$

$$\frac{\frac{\int \frac{x^2(12a+7bn+12b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^3(4a+4b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \; 2784$$

$$\frac{\frac{\frac{\int \frac{2x(12a+13bn+12b\log(cx^n))}{d+ex}dx}{e}-\frac{x^2(12a+12b\log(cx^n)+7bn)}{e(d+ex)}}{2e}-\frac{x^3(4a+4b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \; 27$$

$$\frac{\frac{\frac{2\int \frac{x(12a+13bn+12b\log(cx^n))}{d+ex}dx}{e}-\frac{x^2(12a+12b\log(cx^n)+7bn)}{e(d+ex)}}{2e}-\frac{x^3(4a+4b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \; 2793$$

$$\frac{\frac{\frac{2\int \left(\frac{12a+13bn+12b\log(cx^n)}{e}-\frac{d(12a+13bn+12b\log(cx^n))}{e(d+ex)}\right)dx}{e}-\frac{x^2(12a+12b\log(cx^n)+7bn)}{e(d+ex)}}{2e}-\frac{x^3(4a+4b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \; 2009$$

$$\frac{\frac{\frac{2\left(-\frac{d\log\left(\frac{ex}{d}+1\right)(12a+12b\log(cx^n)+13bn)}{e^2}+\frac{x(12a+13bn)}{e}+\frac{12bx\log(cx^n)}{e}-\frac{12bdn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{12bnx}{e}\right)}{e}-\frac{x^2(12a+12b\log(cx^n)+7bn)}{e(d+ex)}}{2e}-\frac{x^3(4a+4b\log\ldots}{2e(d+\ldots}}{3e}\ldots\frac{x^4(a+b\log(cx^n))}{3e(d+ex)^3}$$

input
```
Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
-1/3*(x^4*(a + b*Log[c*x^n]))/(e*(d + e*x)^3) + (-1/2*(x^3*(4*a + b*n + 4*
b*Log[c*x^n]))/(e*(d + e*x)^2) + (-((x^2*(12*a + 7*b*n + 12*b*Log[c*x^n]))
/(e*(d + e*x))) + (2*((-12*b*n*x)/e + ((12*a + 13*b*n)*x)/e + (12*b*x*Log[
c*x^n])/e - (d*(12*a + 13*b*n + 12*b*Log[c*x^n])*Log[1 + (e*x)/d])/e^2 - (
12*b*d*n*PolyLog[2, -((e*x)/d)])/e^2))/e)/(2*e))/(3*e)
```

3.54. $\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx$

3.54.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.54.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.53 (sec) , antiderivative size = 355, normalized size of antiderivative = 1.94

method	result
risch	$\frac{b\ln(x^n)x}{e^4}-\frac{b\ln(x^n)d^4}{3e^5(ex+d)^3}-\frac{4b\ln(x^n)d\ln(ex+d)}{e^5}-\frac{6b\ln(x^n)d^2}{e^5(ex+d)}+\frac{2b\ln(x^n)d^3}{e^5(ex+d)^2}-\frac{bnx}{e^4}-\frac{bnd}{e^5}+\frac{bn\,d^3}{6e^5(ex+d)^2}-\frac{13bnd\ln(e}{3e^5}$

input
```
int(x^4*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e^4*x-1/3*b*ln(x^n)/e^5*d^4/(e*x+d)^3-4*b*ln(x^n)/e^5*d*ln(e*x+d
)-6*b*ln(x^n)/e^5*d^2/(e*x+d)+2*b*ln(x^n)/e^5*d^3/(e*x+d)^2-b*n*x/e^4-b*n/
e^5*d+1/6*b*n/e^5*d^3/(e*x+d)^2-13/3*b*n/e^5*d*ln(e*x+d)-5/3*b*n/e^5*d^2/(
e*x+d)+13/3*b*n/e^5*d*ln(e*x)+4*b*n/e^5*d*ln(e*x+d)*ln(-e*x/d)+4*b*n/e^5*d
*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi
*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*
Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(x/e^4-1/3/e^5*d^4/(e*x+d)^3-4/e^5*d*ln(e*x+
d)-6/e^5*d^2/(e*x+d)+2/e^5*d^3/(e*x+d)^2)
```

3.54.5 Fricas [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{(ex+d)^4}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b*x^4*log(c*x^n) + a*x^4)/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2
 + 4*d^3*e*x + d^4), x)
```

3.54.6 Sympy [A] (verification not implemented)

Time = 31.90 (sec) , antiderivative size = 563, normalized size of antiderivative = 3.08

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
integrate(x**4*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

output
```
a*d**4*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/e**4 -
 4*a*d**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e**
4 + 6*a*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**4
 - 4*a*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**4 + a*x/e**
4 - b*d**4*n*Piecewise((x/d**4, Eq(e, 0)), (-3*d/(6*d**4*e + 12*d**3*e**2*
x + 6*d**2*e**3*x**2) - 2*e*x/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**
2) - log(x)/(3*d**3*e) + log(d/e + x)/(3*d**3*e), True))/e**4 + b*d**4*Pie
cewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))*log(c*x**n)/e**4
 + 4*b*d**3*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) -
log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/e**4 - 4*b*d**3*Piecew
ise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/e**4 -
6*b*d**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*
e), True))/e**4 + 6*b*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x
), True))*log(c*x**n)/e**4 + 4*b*d*n*Piecewise((x/d, Eq(e, 0)), (Piecewise
((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log
(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(
1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1
, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*lo
g(d) - polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/e**4 - 4*b*d*Pi
ecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))*log(c*x**n)/e**4 - b*n...
```

3.54.7 Maxima [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{(ex+d)^4}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/3*a*((18*d^2*e^2*x^2 + 30*d^3*e*x + 13*d^4)/(e^8*x^3 + 3*d*e^7*x^2 + 3*
d^2*e^6*x + d^3*e^5) - 3*x/e^4 + 12*d*log(e*x + d)/e^5) + b*integrate((x^4
*log(c) + x^4*log(x^n))/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x
 + d^4), x)
```

3.54.8 Giac [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{(ex+d)^4}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^4/(e*x + d)^4, x)
```

3.54.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^4}\,dx = \int \frac{x^4\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^4}\,dx$$

input
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

output
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x)^4, x)
```

3.55 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx$

3.55.1 Optimal result

Integrand size = 21, antiderivative size = 141

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx = -\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3} - \frac{x^2(3a+bn+3b\log(cx^n))}{6e^2(d+ex)^2} - \frac{x(6a+5bn+6b\log(cx^n))}{6e^3(d+ex)} + \frac{(6a+11bn+6b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{6e^4} + \frac{bn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}$$

output
```
-1/3*x^3*(a+b*ln(c*x^n))/e/(e*x+d)^3-1/6*x^2*(3*a+b*n+3*b*ln(c*x^n))/e^2/(
e*x+d)^2-1/6*x*(6*a+5*b*n+6*b*ln(c*x^n))/e^3/(e*x+d)+1/6*(6*a+11*b*n+6*b*l
n(c*x^n))*ln(1+e*x/d)/e^4+b*n*polylog(2,-e*x/d)/e^4
```

3.55.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 179, normalized size of antiderivative = 1.27

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx = \frac{\frac{2d^3(a+b\log(cx^n))}{(d+ex)^3} - \frac{9d^2(a+b\log(cx^n))}{(d+ex)^2} + \frac{18d(a+b\log(cx^n))}{d+ex} - bn\left(\frac{d(3d+2ex)}{(d+ex)^2} + 2\log(x) - 2\log(d+ex)\right) - 18bn(\log(x \ldots}{\ldots}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
((2*d^3*(a + b*Log[c*x^n]))/(d + e*x)^3 - (9*d^2*(a + b*Log[c*x^n]))/(d +
e*x)^2 + (18*d*(a + b*Log[c*x^n]))/(d + e*x) - b*n*((d*(3*d + 2*e*x))/(d +
 e*x)^2 + 2*Log[x] - 2*Log[d + e*x]) - 18*b*n*(Log[x] - Log[d + e*x]) + 9*
b*n*(d/(d + e*x) + Log[x] - Log[d + e*x]) + 6*(a + b*Log[c*x^n])*Log[1 + (
e*x)/d] + 6*b*n*PolyLog[2, -((e*x)/d)])/(6*e^4)
```

3.55.3 Rubi [A] (verified)

Time = 0.54 (sec) , antiderivative size = 158, normalized size of antiderivative = 1.12, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {2784, 2784, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}dx$$

$$\Big\downarrow \text{2784}$$

$$\frac{\int \frac{x^2(3a+bn+3b\log(cx^n))}{(d+ex)^3}dx}{3e}-\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\int \frac{x(6a+5bn+6b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^2(3a+3b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\frac{\int \frac{6a+11bn+6b\log(cx^n)}{d+ex}dx}{e}-\frac{x(6a+6b\log(cx^n)+5bn)}{e(d+ex)}}{2e}-\frac{x^2(3a+3b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \text{2754}$$

$$\frac{\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(6a+6b\log(cx^n)+11bn)}{e}-\frac{6bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x(6a+6b\log(cx^n)+5bn)}{e(d+ex)}}{2e}-\frac{x^2(3a+3b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(6a+6b\log(cx^n)+11bn)}{e}+\frac{6bn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e}-\frac{x(6a+6b\log(cx^n)+5bn)}{e(d+ex)}}{2e}-\frac{x^2(3a+3b\log(cx^n)+bn)}{2e(d+ex)^2}}{3e}-\frac{x^3(a+b\log(cx^n))}{3e(d+ex)^3}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
-1/3*(x^3*(a + b*Log[c*x^n]))/(e*(d + e*x)^3) + (-1/2*(x^2*(3*a + b*n + 3*
b*Log[c*x^n]))/(e*(d + e*x)^2) + (-((x*(6*a + 5*b*n + 6*b*Log[c*x^n]))/(e*
(d + e*x))) + (((6*a + 11*b*n + 6*b*Log[c*x^n])*Log[1 + (e*x)/d])/e + (6*b
*n*PolyLog[2, -((e*x)/d)])/e)/e)/(2*e))/(3*e)
```

3.55.3.1 Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.55.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.54 (sec) , antiderivative size = 310, normalized size of antiderivative = 2.20

method	result
risch	$\frac{b\ln(x^n)d^3}{3e^4(ex+d)^3}+\frac{b\ln(x^n)\ln(ex+d)}{e^4}+\frac{3b\ln(x^n)d}{e^4(ex+d)}-\frac{3b\ln(x^n)d^2}{2e^4(ex+d)^2}+\frac{7bnd}{6e^4(ex+d)}+\frac{11bn\ln(ex+d)}{6e^4}-\frac{bn\,d^2}{6e^4(ex+d)^2}-\frac{11bn\ln(ex}{6e^4}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
1/3*b*ln(x^n)/e^4*d^3/(e*x+d)^3+b*ln(x^n)/e^4*ln(e*x+d)+3*b*ln(x^n)/e^4*d/
(e*x+d)-3/2*b*ln(x^n)/e^4*d^2/(e*x+d)^2+7/6*b*n/e^4*d/(e*x+d)+11/6*b*n/e^4
*ln(e*x+d)-1/6*b*n/e^4*d^2/(e*x+d)^2-11/6*b*n/e^4*ln(e*x)-b*n/e^4*ln(e*x+d
)*ln(-e*x/d)-b*n/e^4*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn
(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn
(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/3/e^4*d^3/(e*x+d)^3+1
/e^4*ln(e*x+d)+3/e^4*d/(e*x+d)-3/2/e^4*d^2/(e*x+d)^2)
```

3.55.5 Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^4}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2
 + 4*d^3*e*x + d^4), x)
```

3.55.6 Sympy [A] (verification not implemented)

Time = 30.94 (sec) , antiderivative size = 518, normalized size of antiderivative = 3.67

$$\int \frac{x^3(a + b\log(cx^n))}{(d + ex)^4}\, dx = \text{Too large to display}$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

output
```
-a*d**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/e**3
+ 3*a*d**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/e*
*3 - 3*a*d*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/e**3 +
 a*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**3 + b*d**3*n*Piec
ewise((x/d**4, Eq(e, 0)), (-3*d/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x
**2) - 2*e*x/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d*
*3*e) + log(d/e + x)/(3*d**3*e), True))/e**3 - b*d**3*Piecewise((x/d**4, E
q(e, 0)), (-1/(3*e*(d + e*x)**3), True))*log(c*x**n)/e**3 - 3*b*d**2*n*Pie
cewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e)
 + log(d/e + x)/(2*d**2*e), True))/e**3 + 3*b*d**2*Piecewise((x/d**3, Eq(e
, 0)), (-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/e**3 + 3*b*d*n*Piecewise
((x/d**2, Eq(e, 0)), (-log(x)/(d*e) + log(d/e + x)/(d*e), True))/e**3 - 3*
b*d*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/e
**3 - b*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-polylog(2, e*x*exp_polar
(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x
*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x*exp_p
olar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log
(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x*exp_p
olar(I*pi)/d), True))/e, True))/e**3 + b*Piecewise((x/d, Eq(e, 0)), (log(d
 + e*x)/e, True))*log(c*x**n)/e**3
```

3.55.7 Maxima [F]

$$\int \frac{x^3(a + b\log(cx^n))}{(d + ex)^4}\, dx = \int \frac{(b\log(cx^n) + a)x^3}{(ex + d)^4}\, dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*a*((18*d*e^2*x^2 + 27*d^2*e*x + 11*d^3)/(e^7*x^3 + 3*d*e^6*x^2 + 3*d^2
*e^5*x + d^3*e^4) + 6*log(e*x + d)/e^4) + b*integrate((x^3*log(c) + x^3*lo
g(x^n))/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

3.55.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^4}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x + d)^4, x)
```

3.55.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^4}\,dx=\int \frac{x^3\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^4}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^4, x)
```

3.56 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4} dx$

3.56.1 Optimal result

Integrand size = 21, antiderivative size = 79

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4} dx = \frac{bdn}{6e^3(d+ex)^2} - \frac{2bn}{3e^3(d+ex)} + \frac{x^3(a+b\log(cx^n))}{3d(d+ex)^3} - \frac{bn\log(d+ex)}{3de^3}$$

output
```
1/6*b*d*n/e^3/(e*x+d)^2-2/3*b*n/e^3/(e*x+d)+1/3*x^3*(a+b*ln(c*x^n))/d/(e*x
+d)^3-1/3*b*n*ln(e*x+d)/d/e^3
```

3.56.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 172 vs. 2(79) = 158.

Time = 0.08 (sec) , antiderivative size = 172, normalized size of antiderivative = 2.18

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4} dx = -\frac{ad^2}{3e^3(d+ex)^3} + \frac{ad}{e^3(d+ex)^2} + \frac{bdn}{6e^3(d+ex)^2} - \frac{a}{e^3(d+ex)} - \frac{2bn}{3e^3(d+ex)} + \frac{bn\log(x)}{3de^3} - \frac{bd^2\log(cx^n)}{3e^3(d+ex)^3} + \frac{bd\log(cx^n)}{e^3(d+ex)^2} - \frac{b\log(cx^n)}{e^3(d+ex)} - \frac{bn\log(d+ex)}{3de^3}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
-1/3*(a*d^2)/(e^3*(d + e*x)^3) + (a*d)/(e^3*(d + e*x)^2) + (b*d*n)/(6*e^3*
(d + e*x)^2) - a/(e^3*(d + e*x)) - (2*b*n)/(3*e^3*(d + e*x)) + (b*n*Log[x]
)/(3*d*e^3) - (b*d^2*Log[c*x^n])/(3*e^3*(d + e*x)^3) + (b*d*Log[c*x^n])/(e
^3*(d + e*x)^2) - (b*Log[c*x^n])/(e^3*(d + e*x)) - (b*n*Log[d + e*x])/(3*d
*e^3)
```

3.56.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 78, normalized size of antiderivative = 0.99, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2773, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4} \, dx$$

$$\Big\downarrow \text{2773}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex)^3} - \frac{bn\int \frac{x^2}{(d+ex)^3}dx}{3d}$$

$$\Big\downarrow \text{49}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex)^3} - \frac{bn\int \left(\frac{d^2}{e^2(d+ex)^3} - \frac{2d}{e^2(d+ex)^2} + \frac{1}{e^2(d+ex)}\right)dx}{3d}$$

$$\Big\downarrow \text{2009}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex)^3} - \frac{bn\left(-\frac{d^2}{2e^3(d+ex)^2} + \frac{2d}{e^3(d+ex)} + \frac{\log(d+ex)}{e^3}\right)}{3d}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
(x^3*(a + b*Log[c*x^n]))/(3*d*(d + e*x)^3) - (b*n*(-1/2*d^2/(e^3*(d + e*x)
^2) + (2*d)/(e^3*(d + e*x)) + Log[d + e*x]/e^3))/(3*d)
```

3.56.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

3.56.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 164 vs. $2(71) = 142$.

Time = 0.51 (sec) , antiderivative size = 165, normalized size of antiderivative = 2.09

method	result
parallelrisch	$\frac{-2\ln(ex+d)x^3 b e^3 n^2-6\ln(ex+d)x^2 bd e^2 n^2+2x^3\ln(c x^n)b e^3 n-6\ln(ex+d)xb d^2 e n^2-4x^2 bd e^2 n^2-2\ln(ex+d)b d^3 n^2-6x^2 ad e}{6nd e^3(ex+d)^3}$
risch	$-\frac{b(3e^2x^2+3dex+d^2)\ln(x^n)}{3(ex+d)^3e^3}-\frac{-6\ln(-x)bd e^2 n x^2-6\ln(-x)b d^2 enx-3i\pi bd e^2x^2\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)-3i\pi b d^2 cs}{}$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
1/6*(-2*ln(e*x+d)*x^3*b*e^3*n^2-6*ln(e*x+d)*x^2*b*d*e^2*n^2+2*x^3*ln(c*x^n
)*b*e^3*n-6*ln(e*x+d)*x*b*d^2*e*n^2-4*x^2*b*d*e^2*n^2-2*ln(e*x+d)*b*d^3*n^
2-6*x^2*a*d*e^2*n-7*x*b*d^2*e*n^2-6*x*a*d^2*e*n-3*b*d^3*n^2-2*a*d^3*n)/n/d
/e^3/(e*x+d)^3
```

3.56.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 178 vs. $2(71) = 142$.

Time = 0.30 (sec) , antiderivative size = 178, normalized size of antiderivative = 2.25

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}\,dx$$
$$= \frac{2\,be^3nx^3\log(x) - 3\,bd^3n - 2\,ad^3 - 2\,(2\,bde^2n + 3\,ade^2)x^2 - (7\,bd^2en + 6\,ad^2e)x - 2\,(be^3nx^3 + 3\,bde^2nx^2}{6\,(de^6x^3 + 3\,d^2e^5x^2 + 3\,d^3e^4x + d^4e^3)}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

output
```
1/6*(2*b*e^3*n*x^3*log(x) - 3*b*d^3*n - 2*a*d^3 - 2*(2*b*d*e^2*n + 3*a*d*e
^2)*x^2 - (7*b*d^2*e*n + 6*a*d^2*e)*x - 2*(b*e^3*n*x^3 + 3*b*d*e^2*n*x^2 +
 3*b*d^2*e*n*x + b*d^3*n)*log(e*x + d) - 2*(3*b*d*e^2*x^2 + 3*b*d^2*e*x +
b*d^3)*log(c))/(d*e^6*x^3 + 3*d^2*e^5*x^2 + 3*d^3*e^4*x + d^4*e^3)
```

3.56.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 677 vs. $2(71) = 142$.

Time = 5.38 (sec) , antiderivative size = 677, normalized size of antiderivative = 8.57

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}\,dx$$
$$= \begin{cases} \tilde{\infty}\left(-\frac{a}{x} - \frac{bn}{x} - \frac{b\log(cx^n)}{x}\right) \\ \frac{\frac{ax^3}{3} - \frac{bnx^3}{9} + \frac{bx^3\log(cx^n)}{3}}{d^4} \\ \frac{-\frac{a}{x} - \frac{bn}{x} - \frac{b\log(cx^n)}{x}}{e^4} \\ -\frac{2ad^3}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3} - \frac{6ad^2ex}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3} - \frac{6ade^2x^2}{6d^4e^3+18d^3e^4x+18d^2e^5x^2+6de^6x^3} - \frac{2bd^3n\,l}{6d^4e^3+18d^3e^4x} \end{cases}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

output
```
Piecewise((zoo*(-a/x - b*n/x - b*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((a
*x**3/3 - b*n*x**3/9 + b*x**3*log(c*x**n)/3)/d**4, Eq(e, 0)), ((-a/x - b*n
/x - b*log(c*x**n)/x)/e**4, Eq(d, 0)), (-2*a*d**3/(6*d**4*e**3 + 18*d**3*e
**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 6*a*d**2*e*x/(6*d**4*e**3 + 1
8*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 6*a*d*e**2*x**2/(6*d*
*4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 2*b*d**3*n
*log(d/e + x)/(6*d**4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6
*x**3) - 3*b*d**3*n/(6*d**4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*
d*e**6*x**3) - 6*b*d**2*e*n*x*log(d/e + x)/(6*d**4*e**3 + 18*d**3*e**4*x +
 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 7*b*d**2*e*n*x/(6*d**4*e**3 + 18*d**
3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) - 6*b*d*e**2*n*x**2*log(d/e
+ x)/(6*d**4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3) -
4*b*d*e**2*n*x**2/(6*d**4*e**3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*
e**6*x**3) - 2*b*e**3*n*x**3*log(d/e + x)/(6*d**4*e**3 + 18*d**3*e**4*x +
18*d**2*e**5*x**2 + 6*d*e**6*x**3) + 2*b*e**3*x**3*log(c*x**n)/(6*d**4*e**
3 + 18*d**3*e**4*x + 18*d**2*e**5*x**2 + 6*d*e**6*x**3), True))
```

3.56.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 179 vs. $2(71) = 142$.

Time = 0.20 (sec) , antiderivative size = 179, normalized size of antiderivative = 2.27

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}\,dx = -\frac{1}{6}\,bn\left(\frac{4\,ex+3\,d}{e^5x^2+2\,de^4x+d^2e^3}+\frac{2\,\log(ex+d)}{de^3}-\frac{2\,\log(x)}{de^3}\right) - \frac{(3\,e^2x^2+3\,dex+d^2)b\log(cx^n)}{3\,(e^6x^3+3\,de^5x^2+3\,d^2e^4x+d^3e^3)} - \frac{(3\,e^2x^2+3\,dex+d^2)a}{3\,(e^6x^3+3\,de^5x^2+3\,d^2e^4x+d^3e^3)}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/6*b*n*((4*e*x + 3*d)/(e^5*x^2 + 2*d*e^4*x + d^2*e^3) + 2*log(e*x + d)/(
d*e^3) - 2*log(x)/(d*e^3)) - 1/3*(3*e^2*x^2 + 3*d*e*x + d^2)*b*log(c*x^n)/
(e^6*x^3 + 3*d*e^5*x^2 + 3*d^2*e^4*x + d^3*e^3) - 1/3*(3*e^2*x^2 + 3*d*e*x
 + d^2)*a/(e^6*x^3 + 3*d*e^5*x^2 + 3*d^2*e^4*x + d^3*e^3)
```

3.56.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 202 vs. $2(71) = 142$.

Time = 0.38 (sec) , antiderivative size = 202, normalized size of antiderivative = 2.56

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}\,dx = -\frac{(3\,be^2nx^2+3\,bdenx+bd^2n)\log(x)}{3\,(e^6x^3+3\,de^5x^2+3\,d^2e^4x+d^3e^3)} - \frac{4\,be^2nx^2+6\,be^2x^2\log(c)+7\,bdenx+6\,ae^2x^2+6\,bdex\log(c)+3\,bd^2n+6\,adex+2\,bd^2\log(c)+2\,ad^2}{6\,(e^6x^3+3\,de^5x^2+3\,d^2e^4x+d^3e^3)} - \frac{bn\log(ex+d)}{3\,de^3} + \frac{bn\log(x)}{3\,de^3}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

output
```
-1/3*(3*b*e^2*n*x^2 + 3*b*d*e*n*x + b*d^2*n)*log(x)/(e^6*x^3 + 3*d*e^5*x^2
 + 3*d^2*e^4*x + d^3*e^3) - 1/6*(4*b*e^2*n*x^2 + 6*b*e^2*x^2*log(c) + 7*b*
d*e*n*x + 6*a*e^2*x^2 + 6*b*d*e*x*log(c) + 3*b*d^2*n + 6*a*d*e*x + 2*b*d^2
*log(c) + 2*a*d^2)/(e^6*x^3 + 3*d*e^5*x^2 + 3*d^2*e^4*x + d^3*e^3) - 1/3*b
*n*log(e*x + d)/(d*e^3) + 1/3*b*n*log(x)/(d*e^3)
```

3.56.9 Mupad [B] (verification not implemented)

Time = 0.78 (sec) , antiderivative size = 167, normalized size of antiderivative = 2.11

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^4}\,dx = -\frac{x^2\,(3\,a\,e^2+2\,b\,e^2\,n)+a\,d^2+x\left(3\,a\,d\,e+\frac{7\,b\,d\,e\,n}{2}\right)+\frac{3\,b\,d^2\,n}{2}}{3\,d^3\,e^3+9\,d^2\,e^4\,x+9\,d\,e^5\,x^2+3\,e^6\,x^3} - \frac{\ln(c\,x^n)\left(\frac{b\,d^2}{3\,e^3}+\frac{b\,x^2}{e}+\frac{b\,d\,x}{e^2}\right)}{d^3+3\,d^2\,e\,x+3\,d\,e^2\,x^2+e^3\,x^3} - \frac{2\,b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d\,e^3}$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

output
```
- (x^2*(3*a*e^2 + 2*b*e^2*n) + a*d^2 + x*(3*a*d*e + (7*b*d*e*n)/2) + (3*b*
d^2*n)/2)/(3*d^3*e^3 + 3*e^6*x^3 + 9*d^2*e^4*x + 9*d*e^5*x^2) - (log(c*x^n
)*((b*d^2)/(3*e^3) + (b*x^2)/e + (b*d*x)/e^2))/(d^3 + e^3*x^3 + 3*d*e^2*x^
2 + 3*d^2*e*x) - (2*b*n*atanh((2*e*x)/d + 1))/(3*d*e^3)
```

3.57 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^4} dx$

3.57.1 Optimal result

Integrand size = 19, antiderivative size = 117

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4} dx = -\frac{bn}{6e^2(d+ex)^2} + \frac{bn}{6de^2(d+ex)} + \frac{bn\log(x)}{6d^2e^2} + \frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3} - \frac{a+b\log(cx^n)}{2e^2(d+ex)^2} - \frac{bn\log(d+ex)}{6d^2e^2}$$

output
```
-1/6*b*n/e^2/(e*x+d)^2+1/6*b*n/d/e^2/(e*x+d)+1/6*b*n*ln(x)/d^2/e^2+1/3*d*(
a+b*ln(c*x^n))/e^2/(e*x+d)^3+1/2*(-a-b*ln(c*x^n))/e^2/(e*x+d)^2-1/6*b*n*ln
(e*x+d)/d^2/e^2
```

3.57.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.15

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4} dx = \frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3} - \frac{a+b\log(cx^n)}{2e^2(d+ex)^2} - \frac{bn\left(\frac{1}{(d+ex)^2} + \frac{2}{d(d+ex)} + \frac{2\log(x)}{d^2} - \frac{2\log(d+ex)}{d^2}\right)}{6e^2} + \frac{bn\left(\frac{1}{d(d+ex)} + \frac{\log(x)}{d^2} - \frac{\log(d+ex)}{d^2}\right)}{2e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
(d*(a + b*Log[c*x^n]))/(3*e^2*(d + e*x)^3) - (a + b*Log[c*x^n])/(2*e^2*(d
+ e*x)^2) - (b*n*((d + e*x)^(-2) + 2/(d*(d + e*x)) + (2*Log[x])/d^2 - (2*L
og[d + e*x])/d^2))/(6*e^2) + (b*n*(1/(d*(d + e*x)) + Log[x]/d^2 - Log[d +
e*x]/d^2))/(2*e^2)
```

3.57.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 97, normalized size of antiderivative = 0.83, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.211$, Rules used = {2782, 27, 86, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4} \, dx$$

$$\Big\downarrow \text{ 2782}$$

$$-bn\int -\frac{d+3ex}{6e^2x(d+ex)^3}dx-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{bn\int \frac{d+3ex}{x(d+ex)^3}dx}{6e^2}-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}$$

$$\Big\downarrow \text{ 86}$$

$$\frac{bn\int \left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{2e}{(d+ex)^3}+\frac{1}{d^2x}\right)dx}{6e^2}-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{a+b\log(cx^n)}{2e^2(d+ex)^2}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex)^3}+\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}-\frac{1}{(d+ex)^2}\right)}{6e^2}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^4,x]
```

output
```
(d*(a + b*Log[c*x^n]))/(3*e^2*(d + e*x)^3) - (a + b*Log[c*x^n])/(2*e^2*(d
+ e*x)^2) + (b*n*(-(d + e*x)^(-2) + 1/(d*(d + e*x)) + Log[x]/d^2 - Log[d +
 e*x]/d^2))/(6*e^2)
```

3.57.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 86
```
Int[((a_.) + (b_.)*(x_))*((c_) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p_
.), x_] :> Int[ExpandIntegrand[(a + b*x)*(c + d*x)^n*(e + f*x)^p, x], x] /;
 FreeQ[{a, b, c, d, e, f, n}, x] && ((ILtQ[n, 0] && ILtQ[p, 0]) || EqQ[p, 1
] || (IGtQ[p, 0] && ( !IntegerQ[n] || LeQ[9*p + 5*(n + 2), 0] || GeQ[n + p
+ 1, 0] || (GeQ[n + p + 2, 0] && RationalQ[a, b, c, d, e, f]))))
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2782
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Simp[(a + b*Log[c*
x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[
{a, b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

3.57.4 Maple [A] (verified)

Time = 0.51 (sec) , antiderivative size = 205, normalized size of antiderivative = 1.75

method	result
parallelrisch	$\frac{-3x\ln(c\,x^n)b\,d^3e^2+xb\,d^3e^2n+x^2b\,d^2e^3n+\ln(x)b\,d^4en-\ln(ex+d)b\,d^4en-\ln(c\,x^n)b\,d^4e+3x^2a\,d^2e^3+x^3ad\,e^4+3\ln(x)xb\,d^3e^2n-}{6d^3e^3(ex+d)^3}$
risch	$-\frac{b(3ex+d)\ln(x^n)}{6(ex+d)^3e^2}-\frac{3i\pi b\,d^2\operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2ex+i\pi b\,d^3\operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2-i\pi b\,d^3\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)-3i}{}$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
1/6*(-3*x*ln(c*x^n)*b*d^3*e^2+x*b*d^3*e^2*n+x^2*b*d^2*e^3*n+ln(x)*b*d^4*e*
n-ln(e*x+d)*b*d^4*e*n-ln(c*x^n)*b*d^4*e+3*x^2*a*d^2*e^3+x^3*a*d*e^4+3*ln(x
)*x*b*d^3*e^2*n-3*ln(e*x+d)*x*b*d^3*e^2*n+ln(x)*x^3*b*d*e^4*n-ln(e*x+d)*x^
3*b*d*e^4*n+3*ln(x)*x^2*b*d^2*e^3*n-3*ln(e*x+d)*x^2*b*d^2*e^3*n)/d^3/e^3/(
e*x+d)^3
```

3.57.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 162, normalized size of antiderivative = 1.38

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx$$
$$= \frac{bde^2nx^2 - ad^3 + (bd^2en - 3\,ad^2e)x - (be^3nx^3 + 3\,bde^2nx^2 + 3\,bd^2enx + bd^3n)\log(ex+d) - (3\,bd^2ex + b\ldots}{6\,(d^2e^5x^3 + 3\,d^3e^4x^2 + 3\,d^4e^3x + d^5e^2)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

output
```
1/6*(b*d*e^2*n*x^2 - a*d^3 + (b*d^2*e*n - 3*a*d^2*e)*x - (b*e^3*n*x^3 + 3*
b*d*e^2*n*x^2 + 3*b*d^2*e*n*x + b*d^3*n)*log(e*x + d) - (3*b*d^2*e*x + b*d
^3)*log(c) + (b*e^3*n*x^3 + 3*b*d*e^2*n*x^2)*log(x))/(d^2*e^5*x^3 + 3*d^3*
e^4*x^2 + 3*d^4*e^3*x + d^5*e^2)
```

3.57.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 661 vs. 2(112) = 224.

Time = 5.32 (sec) , antiderivative size = 661, normalized size of antiderivative = 5.65

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx$$
$$= \begin{cases} \tilde{\infty}\left(-\frac{a}{2x^2} - \frac{bn}{4x^2} - \frac{b\log(cx^n)}{2x^2}\right) \\ \frac{\frac{ax^2}{2} - \frac{bnx^2}{4} + \frac{bx^2\log(cx^n)}{2}}{d^4} \\ \frac{-\frac{a}{2x^2} - \frac{bn}{4x^2} - \frac{b\log(cx^n)}{2x^2}}{e^4} \\ -\frac{ad^3}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3} - \frac{3ad^2ex}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3} - \frac{bd^3n\log\left(\frac{d}{e}+x\right)}{6d^5e^2+18d^4e^3x+18d^3e^4x^2+6d^2e^5x^3} - \frac{3bd^2\ldots}{6d^5e^2+18d^4e\ldots} \end{cases}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d)**4,x)
```

output
```
Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d
, 0) & Eq(e, 0)), ((a*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**4, Eq
(e, 0)), ((-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**4, Eq(d
, 0)), (-a*d**3/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2
*e**5*x**3) - 3*a*d**2*e*x/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x*
*2 + 6*d**2*e**5*x**3) - b*d**3*n*log(d/e + x)/(6*d**5*e**2 + 18*d**4*e**3
*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*x**3) - 3*b*d**2*e*n*x*log(d/e + x)/(
6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*x**3) + b*d
**2*e*n*x/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*
x**3) - 3*b*d*e**2*n*x**2*log(d/e + x)/(6*d**5*e**2 + 18*d**4*e**3*x + 18*
d**3*e**4*x**2 + 6*d**2*e**5*x**3) + b*d*e**2*n*x**2/(6*d**5*e**2 + 18*d**
4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*x**3) + 3*b*d*e**2*x**2*log(c*x
**n)/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*x**3)
 - b*e**3*n*x**3*log(d/e + x)/(6*d**5*e**2 + 18*d**4*e**3*x + 18*d**3*e**4
*x**2 + 6*d**2*e**5*x**3) + b*e**3*x**3*log(c*x**n)/(6*d**5*e**2 + 18*d**4
*e**3*x + 18*d**3*e**4*x**2 + 6*d**2*e**5*x**3), True))
```

3.57.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.28

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx = \frac{1}{6}bn\left(\frac{x}{de^3x^2+2\,d^2e^2x+d^3e}-\frac{\log(ex+d)}{d^2e^2}+\frac{\log(x)}{d^2e^2}\right) - \frac{(3\,ex+d)b\log(cx^n)}{6\,(e^5x^3+3\,de^4x^2+3\,d^2e^3x+d^3e^2)} - \frac{(3\,ex+d)a}{6\,(e^5x^3+3\,de^4x^2+3\,d^2e^3x+d^3e^2)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*b*n*(x/(d*e^3*x^2 + 2*d^2*e^2*x + d^3*e) - log(e*x + d)/(d^2*e^2) + lo
g(x)/(d^2*e^2)) - 1/6*(3*e*x + d)*b*log(c*x^n)/(e^5*x^3 + 3*d*e^4*x^2 + 3*
d^2*e^3*x + d^3*e^2) - 1/6*(3*e*x + d)*a/(e^5*x^3 + 3*d*e^4*x^2 + 3*d^2*e^
3*x + d^3*e^2)
```

3.57.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.39

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx = -\frac{(3\,benx+bdn)\log(x)}{6\,(e^5x^3+3\,de^4x^2+3\,d^2e^3x+d^3e^2)} + \frac{be^2nx^2+bdenx-3\,bdex\log(c)-3\,adex-bd^2\log(c)-ad^2}{6\,(de^5x^3+3\,d^2e^4x^2+3\,d^3e^3x+d^4e^2)} - \frac{bn\log(ex+d)}{6\,d^2e^2} + \frac{bn\log(x)}{6\,d^2e^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

output
```
-1/6*(3*b*e*n*x + b*d*n)*log(x)/(e^5*x^3 + 3*d*e^4*x^2 + 3*d^2*e^3*x + d^3
*e^2) + 1/6*(b*e^2*n*x^2 + b*d*e*n*x - 3*b*d*e*x*log(c) - 3*a*d*e*x - b*d^
2*log(c) - a*d^2)/(d*e^5*x^3 + 3*d^2*e^4*x^2 + 3*d^3*e^3*x + d^4*e^2) - 1/
6*b*n*log(e*x + d)/(d^2*e^2) + 1/6*b*n*log(x)/(d^2*e^2)
```

3.57.9 Mupad [B] (verification not implemented)

Time = 0.67 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.21

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^4}\,dx = -\frac{a\,d+x\,(3\,a\,e-b\,e\,n)-\frac{b\,e^2\,n\,x^2}{d}}{6\,d^3\,e^2+18\,d^2\,e^3\,x+18\,d\,e^4\,x^2+6\,e^5\,x^3} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d}{6\,e^2}+\frac{b\,x}{2\,e}\right)}{d^3+3\,d^2\,e\,x+3\,d\,e^2\,x^2+e^3\,x^3} - \frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d^2\,e^2}$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^4,x)
```

output
```
- (a*d + x*(3*a*e - b*e*n) - (b*e^2*n*x^2)/d)/(6*d^3*e^2 + 6*e^5*x^3 + 18*
d^2*e^3*x + 18*d*e^4*x^2) - (log(c*x^n)*((b*d)/(6*e^2) + (b*x)/(2*e)))/(d^
3 + e^3*x^3 + 3*d*e^2*x^2 + 3*d^2*e*x) - (b*n*atanh((2*e*x)/d + 1))/(3*d^2
*e^2)
```

3.58 $\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx$

3.58.1 Optimal result

Integrand size = 18, antiderivative size = 95

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx = \frac{bn}{6de(d+ex)^2}+\frac{bn}{3d^2e(d+ex)}+\frac{bn\log(x)}{3d^3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}-\frac{bn\log(d+ex)}{3d^3e}$$

output
```
1/6*b*n/d/e/(e*x+d)^2+1/3*b*n/d^2/e/(e*x+d)+1/3*b*n*ln(x)/d^3/e+1/3*(-a-b*
ln(c*x^n))/e/(e*x+d)^3-1/3*b*n*ln(e*x+d)/d^3/e
```

3.58.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 66, normalized size of antiderivative = 0.69

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx = \frac{-\frac{a+b\log(cx^n)}{(d+ex)^3}+\frac{bn\left(\frac{d(3d+2ex)}{(d+ex)^2}+2\log(x)-2\log(d+ex)\right)}{2d^3}}{3e}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x)^4,x]
```

output
```
(-((a + b*Log[c*x^n])/(d + e*x)^3) + (b*n*((d*(3*d + 2*e*x))/(d + e*x)^2 +
 2*Log[x] - 2*Log[d + e*x]))/(2*d^3))/(3*e)
```

3.58.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 77, normalized size of antiderivative = 0.81, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {2756, 54, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4}dx$$

$$\Big\downarrow \ 2756$$

$$\frac{bn\int \frac{1}{x(d+ex)^3}dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}$$

$$\Big\downarrow \ 54$$

$$\frac{bn\int \left(-\frac{e}{d^3(d+ex)}-\frac{e}{d^2(d+ex)^2}-\frac{e}{d(d+ex)^3}+\frac{1}{d^3x}\right)dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}$$

$$\Big\downarrow \ 2009$$

$$\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x)^4,x]
```

output
```
-1/3*(a + b*Log[c*x^n])/(e*(d + e*x)^3) + (b*n*(1/(2*d*(d + e*x)^2) + 1/(d
^2*(d + e*x)) + Log[x]/d^3 - Log[d + e*x]/d^3))/(3*e)
```

3.58.3.1 Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

3.58.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 187 vs. $2(88) = 176$.

Time = 0.49 (sec) , antiderivative size = 188, normalized size of antiderivative = 1.98

method	result
parallelrisch	$\frac{-5x^3b\,e^5n-6\ln(c\,x^n)b\,d^3e^2+4b\,d^3e^2n-6a\,d^3e^2+18\ln(x)x^2bd\,e^4n-18\ln(ex+d)x^2bd\,e^4n+18\ln(x)xb\,d^2e^3n-18\ln(ex+d)xb\,d^2 \cdots}{18e^3d^3(ex+d)^3}$
risch	$-\frac{b\ln(x^n)}{3e(ex+d)^3}-\frac{2\ln(ex+d)b\,e^3n\,x^3-2\ln(-x)b\,e^3n\,x^3-i\pi b\,d^3\operatorname{csgn}(ic\,x^n)^3+i\pi b\,d^3\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2+i\pi b\,d^3\operatorname{csgn}(ic)\operatorname{cs} \cdots}{\cdots}$

input
```
int((a+b*ln(c*x^n))/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
1/18*(-5*x^3*b*e^5*n-6*ln(c*x^n)*b*d^3*e^2+4*b*d^3*e^2*n-6*a*d^3*e^2+18*ln
(x)*x^2*b*d*e^4*n-18*ln(e*x+d)*x^2*b*d*e^4*n+18*ln(x)*x*b*d^2*e^3*n-18*ln(
e*x+d)*x*b*d^2*e^3*n+6*ln(x)*b*d^3*e^2*n-6*ln(e*x+d)*b*d^3*e^2*n-9*x^2*b*d
*e^4*n+6*ln(x)*x^3*b*e^5*n-6*ln(e*x+d)*x^3*b*e^5*n)/e^3/d^3/(e*x+d)^3
```

3.58.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 160, normalized size of antiderivative = 1.68

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx = \frac{2\,bde^2nx^2+5\,bd^2enx+3\,bd^3n-2\,bd^3\log(c)-2\,ad^3-2\left(be^3nx^3+3\,bde^2nx^2+3\,bd^2enx+bd^3n\right)\log(ex \cdots}{6\left(d^3e^4x^3+3\,d^4e^3x^2+3\,d^5e^2x+d^6e\right)}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="fricas")
```

output
```
1/6*(2*b*d*e^2*n*x^2 + 5*b*d^2*e*n*x + 3*b*d^3*n - 2*b*d^3*log(c) - 2*a*d^
3 - 2*(b*e^3*n*x^3 + 3*b*d*e^2*n*x^2 + 3*b*d^2*e*n*x + b*d^3*n)*log(e*x +
d) + 2*(b*e^3*n*x^3 + 3*b*d*e^2*n*x^2 + 3*b*d^2*e*n*x)*log(x))/(d^3*e^4*x^
3 + 3*d^4*e^3*x^2 + 3*d^5*e^2*x + d^6*e)
```

3.58.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 700 vs. $2(83) = 166$.

Time = 5.35 (sec) , antiderivative size = 700, normalized size of antiderivative = 7.37

$$\int \frac{a + b\log(cx^n)}{(d + ex)^4}\,dx$$
$$= \begin{cases} \tilde{\infty}\left(-\frac{a}{3x^3} - \frac{bn}{9x^3} - \frac{b\log(cx^n)}{3x^3}\right) \\ \frac{ax - bnx + bx\log(cx^n)}{d^4} \\ \frac{-\frac{a}{3x^3} - \frac{bn}{9x^3} - \frac{b\log(cx^n)}{3x^3}}{e^4} \\ -\frac{2ad^3}{6d^6e + 18d^5e^2x + 18d^4e^3x^2 + 6d^3e^4x^3} - \frac{2bd^3n\log\left(\frac{d}{e} + x\right)}{6d^6e + 18d^5e^2x + 18d^4e^3x^2 + 6d^3e^4x^3} + \frac{3bd^3n}{6d^6e + 18d^5e^2x + 18d^4e^3x^2 + 6d^3e^4x^3} - \frac{6bd^2enx}{6d^6e + 18d^5e^2x +} \end{cases}$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d)**4,x)
```

output
```
Piecewise((zoo*(-a/(3*x**3) - b*n/(9*x**3) - b*log(c*x**n)/(3*x**3)), Eq(d
, 0) & Eq(e, 0)), ((a*x - b*n*x + b*x*log(c*x**n))/d**4, Eq(e, 0)), ((-a/(
3*x**3) - b*n/(9*x**3) - b*log(c*x**n)/(3*x**3))/e**4, Eq(d, 0)), (-2*a*d*
*3/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) - 2*
b*d**3*n*log(d/e + x)/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d
**3*e**4*x**3) + 3*b*d**3*n/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2
 + 6*d**3*e**4*x**3) - 6*b*d**2*e*n*x*log(d/e + x)/(6*d**6*e + 18*d**5*e**
2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) + 5*b*d**2*e*n*x/(6*d**6*e + 1
8*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) + 6*b*d**2*e*x*log(c
*x**n)/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3)
- 6*b*d*e**2*n*x**2*log(d/e + x)/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3
*x**2 + 6*d**3*e**4*x**3) + 2*b*d*e**2*n*x**2/(6*d**6*e + 18*d**5*e**2*x +
 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) + 6*b*d*e**2*x**2*log(c*x**n)/(6*d*
*6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3*e**4*x**3) - 2*b*e**3*n
*x**3*log(d/e + x)/(6*d**6*e + 18*d**5*e**2*x + 18*d**4*e**3*x**2 + 6*d**3
*e**4*x**3) + 2*b*e**3*x**3*log(c*x**n)/(6*d**6*e + 18*d**5*e**2*x + 18*d*
*4*e**3*x**2 + 6*d**3*e**4*x**3), True))
```

3.58.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.52

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx = \frac{1}{6}\,bn\left(\frac{2\,ex+3\,d}{d^2e^3x^2+2\,d^3e^2x+d^4e}-\frac{2\,\log(ex+d)}{d^3e}+\frac{2\,\log(x)}{d^3e}\right) - \frac{b\log(cx^n)}{3\,(e^4x^3+3\,de^3x^2+3\,d^2e^2x+d^3e)} - \frac{a}{3\,(e^4x^3+3\,de^3x^2+3\,d^2e^2x+d^3e)}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*b*n*((2*e*x + 3*d)/(d^2*e^3*x^2 + 2*d^3*e^2*x + d^4*e) - 2*log(e*x + d
)/(d^3*e) + 2*log(x)/(d^3*e)) - 1/3*b*log(c*x^n)/(e^4*x^3 + 3*d*e^3*x^2 +
3*d^2*e^2*x + d^3*e) - 1/3*a/(e^4*x^3 + 3*d*e^3*x^2 + 3*d^2*e^2*x + d^3*e)
```

3.58.8 Giac [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 147, normalized size of antiderivative = 1.55

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx = -\frac{bn\log(x)}{3\,(e^4x^3+3\,de^3x^2+3\,d^2e^2x+d^3e)} + \frac{2\,be^2nx^2+5\,bdenx+3\,bd^2n-2\,bd^2\log(c)-2\,ad^2}{6\,(d^2e^4x^3+3\,d^3e^3x^2+3\,d^4e^2x+d^5e)} - \frac{bn\log(ex+d)}{3\,d^3e} + \frac{bn\log(x)}{3\,d^3e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^4,x, algorithm="giac")
```

output
```
-1/3*b*n*log(x)/(e^4*x^3 + 3*d*e^3*x^2 + 3*d^2*e^2*x + d^3*e) + 1/6*(2*b*e
^2*n*x^2 + 5*b*d*e*n*x + 3*b*d^2*n - 2*b*d^2*log(c) - 2*a*d^2)/(d^2*e^4*x^
3 + 3*d^3*e^3*x^2 + 3*d^4*e^2*x + d^5*e) - 1/3*b*n*log(e*x + d)/(d^3*e) +
1/3*b*n*log(x)/(d^3*e)
```

3.58.9 Mupad [B] (verification not implemented)

Time = 0.57 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.34

$$\int \frac{a+b\log(cx^n)}{(d+ex)^4}\,dx = \frac{\frac{3\,b\,n}{2}-a+\frac{b\,e^2\,n\,x^2}{d^2}+\frac{5\,b\,e\,n\,x}{2\,d}}{3\,d^3\,e+9\,d^2\,e^2\,x+9\,d\,e^3\,x^2+3\,e^4\,x^3} - \frac{b\,\ln\left(c\,x^n\right)}{3\,e\,\left(d^3+3\,d^2\,e\,x+3\,d\,e^2\,x^2+e^3\,x^3\right)} - \frac{2\,b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d^3\,e}$$

input
```
int((a + b*log(c*x^n))/(d + e*x)^4,x)
```

output
```
((3*b*n)/2 - a + (b*e^2*n*x^2)/d^2 + (5*b*e*n*x)/(2*d))/(3*d^3*e + 3*e^4*x
^3 + 9*d^2*e^2*x + 9*d*e^3*x^2) - (b*log(c*x^n))/(3*e*(d^3 + e^3*x^3 + 3*d
*e^2*x^2 + 3*d^2*e*x)) - (2*b*n*atanh((2*e*x)/d + 1))/(3*d^3*e)
```

3.59 $\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx$

3.59.1 Optimal result

Integrand size = 21, antiderivative size = 174

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx = & -\frac{bn}{6d^2(d+ex)^2}-\frac{5bn}{6d^3(d+ex)}-\frac{5bn\log(x)}{6d^4} \\ & +\frac{a+b\log(cx^n)}{3d(d+ex)^3}+\frac{a+b\log(cx^n)}{2d^2(d+ex)^2} \\ & -\frac{ex(a+b\log(cx^n))}{d^4(d+ex)}-\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4} \\ & +\frac{11bn\log(d+ex)}{6d^4}+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}\end{aligned}$$

output
```
-1/6*b*n/d^2/(e*x+d)^2-5/6*b*n/d^3/(e*x+d)-5/6*b*n*ln(x)/d^4+1/3*(a+b*ln(c
*x^n))/d/(e*x+d)^3+1/2*(a+b*ln(c*x^n))/d^2/(e*x+d)^2-e*x*(a+b*ln(c*x^n))/d
^4/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))/d^4+11/6*b*n*ln(e*x+d)/d^4+b*n*poly
log(2,-d/e/x)/d^4
```

3.59.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 222, normalized size of antiderivative = 1.28

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx$$
$$= \frac{\frac{3a^2}{bn}+\frac{2ad^3}{(d+ex)^3}+\frac{3ad^2}{(d+ex)^2}-\frac{bd^2n}{(d+ex)^2}+\frac{6ad}{d+ex}-\frac{5bdn}{d+ex}-11bn\log(x)+\frac{6a\log(cx^n)}{n}+\frac{2bd^3\log(cx^n)}{(d+ex)^3}+\frac{3bd^2\log(cx^n)}{(d+ex)^2}+\frac{6bd\,\cdots}{\cdots}}{6\cdots}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^4),x]
```

output
```
((3*a^2)/(b*n) + (2*a*d^3)/(d + e*x)^3 + (3*a*d^2)/(d + e*x)^2 - (b*d^2*n)
/(d + e*x)^2 + (6*a*d)/(d + e*x) - (5*b*d*n)/(d + e*x) - 11*b*n*Log[x] + (
6*a*Log[c*x^n])/n + (2*b*d^3*Log[c*x^n])/(d + e*x)^3 + (3*b*d^2*Log[c*x^n]
)/(d + e*x)^2 + (6*b*d*Log[c*x^n])/(d + e*x) + (3*b*Log[c*x^n]^2)/n + 11*b
*n*Log[d + e*x] - 6*a*Log[1 + (e*x)/d] - 6*b*Log[c*x^n]*Log[1 + (e*x)/d] -
 6*b*n*PolyLog[2, -((e*x)/d)])/(6*d^4)
```

3.59.3 Rubi [A] (verified)

Time = 1.01 (sec) , antiderivative size = 256, normalized size of antiderivative = 1.47, number of steps used = 13, number of rules used = 13, $\frac{\text{number of rules}}{\text{integrand size}} = 0.619$, Rules used = {2789, 2756, 54, 2009, 2789, 2756, 54, 2009, 2789, 2751, 16, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx$$

$$\Big\downarrow \text{2789}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^4}dx}{d}$$

$$\Big\downarrow \text{2756}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^3}dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{54}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{bn\int\left(-\frac{e}{d^3(d+ex)}-\frac{e}{d^2(d+ex)^2}-\frac{e}{d(d+ex)^3}+\frac{1}{d^3x}\right)dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{ 2789}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^3}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{ 2756}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^2}dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{ 54}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int\left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{1}{d^2x}\right)dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \text{ 2789}$$

3.59. $\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx$

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \; 2751$$

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \; 16$$

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \; 2779$$

$$\frac{\frac{\frac{\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \; 2838$$

$$\frac{\frac{\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}$$

3.59. $\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x)^4),x]
```

output
```
-((e*(-1/3*(a + b*Log[c*x^n])/(e*(d + e*x)^3) + (b*n*(1/(2*d*(d + e*x)^2)
+ 1/(d^2*(d + e*x)) + Log[x]/d^3 - Log[d + e*x]/d^3))/(3*e)))/d) + (-((e*(
-1/2*(a + b*Log[c*x^n])/(e*(d + e*x)^2) + (b*n*(1/(d*(d + e*x)) + Log[x]/d
^2 - Log[d + e*x]/d^2))/(2*e)))/d) + (-((e*((x*(a + b*Log[c*x^n]))/(d*(d +
 e*x)) - (b*n*Log[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*(a + b*Log[c
*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/d)/d)/d)/d
```

3.59.3.1 Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.59.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.71 (sec) , antiderivative size = 316, normalized size of antiderivative = 1.82

method	result
risch	$-\frac{b\ln(x^n)\ln(ex+d)}{d^4}+\frac{b\ln(x^n)}{d^3(ex+d)}+\frac{b\ln(x^n)}{2d^2(ex+d)^2}+\frac{b\ln(x^n)}{3d(ex+d)^3}+\frac{b\ln(x^n)\ln(x)}{d^4}-\frac{5bn}{6d^3(ex+d)}-\frac{bn}{6d^2(ex+d)^2}+\frac{11bn\ln(ex}{6d^4}$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d^4*ln(e*x+d)+b*ln(x^n)/d^3/(e*x+d)+1/2*b*ln(x^n)/d^2/(e*x+d)^2
+1/3*b*ln(x^n)/d/(e*x+d)^3+b*ln(x^n)/d^4*ln(x)-5/6*b*n/d^3/(e*x+d)-1/6*b*n
/d^2/(e*x+d)^2+11/6*b*n*ln(e*x+d)/d^4-11/6*b*n*ln(x)/d^4-1/2*b*n/d^4*ln(x)
^2+b*n/d^4*ln(e*x+d)*ln(-e*x/d)+b*n/d^4*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*
Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-1/d
^4*ln(e*x+d)+1/d^3/(e*x+d)+1/2/d^2/(e*x+d)^2+1/3/d/(e*x+d)^3+1/d^4*ln(x))
```

3.59.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^4x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^4*x^5 + 4*d*e^3*x^4 + 6*d^2*e^2*x^3 + 4*d^3
*e*x^2 + d^4*x), x)
```

3.59.6 Sympy [A] (verification not implemented)

Time = 58.96 (sec) , antiderivative size = 510, normalized size of antiderivative = 2.93

$$
\begin{aligned}
\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx = &-\frac{ae\left(\begin{cases}\frac{x}{d^4} & \text{for } e=0\\ -\frac{1}{3e(d+ex)^3} & \text{otherwise}\end{cases}\right)}{d} - \frac{ae\left(\begin{cases}\frac{x}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex)^2} & \text{otherwise}\end{cases}\right)}{d^2}\\
&- \frac{ae\left(\begin{cases}\frac{x}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x} & \text{otherwise}\end{cases}\right)}{d^3} - \frac{ae\left(\begin{cases}\frac{x}{d} & \text{for } e=0\\ \frac{\log(d+ex)}{e} & \text{otherwise}\end{cases}\right)}{d^4} + \frac{a\log(x)}{d^4}\\
&- \frac{be^3n\left(\begin{cases}-\frac{1}{e^4x} & \text{for } d=0\\ -\frac{3d}{6d^2e^3+12de^4x+6e^5x^2} - \frac{4ex}{6d^2e^3+12de^4x+6e^5x^2} - \frac{\log(d+ex)}{3de^3} & \text{otherwise}\end{cases}\right)}{d^3}\\
&+ \frac{be^3\left(\begin{cases}\frac{1}{e^4x} & \text{for } d=0\\ -\frac{1}{3d\left(\frac{d}{x}+e\right)^3} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3}\\
&+ \frac{3be^2n\left(\begin{cases}-\frac{1}{e^3x} & \text{for } d=0\\ -\frac{1}{2de^2+2e^3x} - \frac{\log(d+ex)}{2de^2} & \text{otherwise}\end{cases}\right)}{d^3}\\
&- \frac{3be^2\left(\begin{cases}\frac{1}{e^3x} & \text{for } d=0\\ -\frac{1}{2d\left(\frac{d}{x}+e\right)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3}\\
&- \frac{3ben\left(\begin{cases}-\frac{1}{e^2x} & \text{for } d=0\\ -\frac{\log(d^2+dex)}{de} & \text{otherwise}\end{cases}\right)}{d^3} + \frac{3be\left(\begin{cases}\frac{1}{e^2x} & \text{for } d=0\\ -\frac{1}{\frac{d^2}{x}+de} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3}\\
&+ \frac{bn\left(\begin{cases}-\frac{1}{ex} \\ \frac{\begin{cases}\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(e)\log(x)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{d^3}\\
&b\left(\begin{cases}\frac{1}{ex} & \text{for } d=0\\ \frac{\log\left(\frac{d}{x}+e\right)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)
\end{aligned}
$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d)**4,x)
```

output
```
-a*e*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/d - a*e*
Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**2 - a*e*Pi
ecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**3 - a*e*Piecewis
e((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/d**4 + a*log(x)/d**4 - b*e**3*n
*Piecewise((-1/(e**4*x), Eq(d, 0)), (-3*d/(6*d**2*e**3 + 12*d*e**4*x + 6*e
**5*x**2) - 4*e*x/(6*d**2*e**3 + 12*d*e**4*x + 6*e**5*x**2) - log(d + e*x)
/(3*d*e**3), True))/d**3 + b*e**3*Piecewise((1/(e**4*x), Eq(d, 0)), (-1/(3
*d*(d/x + e)**3), True))*log(c*x**n)/d**3 + 3*b*e**2*n*Piecewise((-1/(e**3
*x), Eq(d, 0)), (-1/(2*d*e**2 + 2*e**3*x) - log(d + e*x)/(2*d*e**2), True)
)/d**3 - 3*b*e**2*Piecewise((1/(e**3*x), Eq(d, 0)), (-1/(2*d*(d/x + e)**2)
, True))*log(c*x**n)/d**3 - 3*b*e*n*Piecewise((-1/(e**2*x), Eq(d, 0)), (-l
og(d**2 + d*e*x)/(d*e), True))/d**3 + 3*b*e*Piecewise((1/(e**2*x), Eq(d, 0
)), (-1/(d**2/x + d*e), True))*log(c*x**n)/d**3 + b*n*Piecewise((-1/(e*x),
 Eq(d, 0)), (Piecewise((polylog(2, d*exp_polar(I*pi)/(e*x)), (Abs(x) < 1)
& (1/Abs(x) < 1)), (log(e)*log(x) + polylog(2, d*exp_polar(I*pi)/(e*x)), A
bs(x) < 1), (-log(e)*log(1/x) + polylog(2, d*exp_polar(I*pi)/(e*x)), 1/Abs
(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1
), ()), ((), (0, 0)), x)*log(e) + polylog(2, d*exp_polar(I*pi)/(e*x)), Tru
e))/d, True))/d**3 - b*Piecewise((1/(e*x), Eq(d, 0)), (log(d/x + e)/d, Tru
e))*log(c*x**n)/d**3
```

3.59.7 Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x(d + ex)^4}\,dx = \int \frac{b\log(cx^n) + a}{(ex + d)^4 x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*a*((6*e^2*x^2 + 15*d*e*x + 11*d^2)/(d^3*e^3*x^3 + 3*d^4*e^2*x^2 + 3*d^
5*e*x + d^6) - 6*log(e*x + d)/d^4 + 6*log(x)/d^4) + b*integrate((log(c) +
log(x^n))/(e^4*x^5 + 4*d*e^3*x^4 + 6*d^2*e^2*x^3 + 4*d^3*e*x^2 + d^4*x), x
)
```

3.59.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^4x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^4*x), x)
```

3.59.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^4}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x)^4}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^4),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^4), x)
```

3.60 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx$

3.60.1 Optimal result

Integrand size = 21, antiderivative size = 211

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx = -\frac{bn}{d^4x}+\frac{ben}{6d^3(d+ex)^2}+\frac{4ben}{3d^4(d+ex)}+\frac{4ben\log(x)}{3d^5} - \frac{a+b\log(cx^n)}{d^4x}-\frac{e(a+b\log(cx^n))}{3d^2(d+ex)^3}-\frac{e(a+b\log(cx^n))}{d^3(d+ex)^2} + \frac{3e^2x(a+b\log(cx^n))}{d^5(d+ex)}+\frac{4e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^5} - \frac{13ben\log(d+ex)}{3d^5}-\frac{4ben\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^5}$$

output
```
-b*n/d^4/x+1/6*b*e*n/d^3/(e*x+d)^2+4/3*b*e*n/d^4/(e*x+d)+4/3*b*e*n*ln(x)/d
^5+(-a-b*ln(c*x^n))/d^4/x-1/3*e*(a+b*ln(c*x^n))/d^2/(e*x+d)^3-e*(a+b*ln(c*
x^n))/d^3/(e*x+d)^2+3*e^2*x*(a+b*ln(c*x^n))/d^5/(e*x+d)+4*e*ln(1+d/e/x)*(a
+b*ln(c*x^n))/d^5-13/3*b*e*n*ln(e*x+d)/d^5-4*b*e*n*polylog(2,-d/e/x)/d^5
```

3.60.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 231, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx$$
$$= \frac{-\frac{6bdn}{x}-\frac{6d(a+b\log(cx^n))}{x}-\frac{2d^3e(a+b\log(cx^n))}{(d+ex)^3}-\frac{6d^2e(a+b\log(cx^n))}{(d+ex)^2}-\frac{18de(a+b\log(cx^n))}{d+ex}-\frac{12e(a+b\log(cx^n))^2}{bn}+ben\left(\frac{d(3d+}{(d+e}\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^4),x]
```

output
```
((-6*b*d*n)/x - (6*d*(a + b*Log[c*x^n]))/x - (2*d^3*e*(a + b*Log[c*x^n]))/
(d + e*x)^3 - (6*d^2*e*(a + b*Log[c*x^n]))/(d + e*x)^2 - (18*d*e*(a + b*Lo
g[c*x^n]))/(d + e*x) - (12*e*(a + b*Log[c*x^n])^2)/(b*n) + b*e*n*((d*(3*d
+ 2*e*x))/(d + e*x)^2 + 2*Log[x] - 2*Log[d + e*x]) + 18*b*e*n*(Log[x] - Lo
g[d + e*x]) + 6*b*e*n*(d/(d + e*x) + Log[x] - Log[d + e*x]) + 24*e*(a + b*
Log[c*x^n])*Log[1 + (e*x)/d] + 24*b*e*n*PolyLog[2, -((e*x)/d)])/(6*d^5)
```

3.60.3 Rubi [A] (verified)

Time = 0.51 (sec) , antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx$$
$$\Big\downarrow \text{2793}$$
$$\int \left(\frac{3e^2(a+b\log(cx^n))}{d^4(d+ex)^2}-\frac{4e(a+b\log(cx^n))}{d^4x(d+ex)}+\frac{a+b\log(cx^n)}{d^4x^2}+\frac{2e^2(a+b\log(cx^n))}{d^3(d+ex)^3}+\frac{e^2(a+b\log(cx^n))}{d^2(d+ex)^4}\right)dx$$
$$\Big\downarrow \text{2009}$$

$$\frac{3e^2x(a+b\log(cx^n))}{d^5(d+ex)}+\frac{4e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^5}-\frac{a+b\log(cx^n)}{d^4x}-\frac{e(a+b\log(cx^n))}{d^3(d+ex)^2}-\frac{e(a+b\log(cx^n))}{3d^2(d+ex)^3}-\frac{4ben\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^5}+\frac{4ben\log(x)}{3d^5}-\frac{13ben\log(d+ex)}{3d^5}+\frac{4ben}{3d^4(d+ex)}-\frac{bn}{d^4x}+\frac{ben}{6d^3(d+ex)^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^4),x]
```

output
```
-((b*n)/(d^4*x)) + (b*e*n)/(6*d^3*(d + e*x)^2) + (4*b*e*n)/(3*d^4*(d + e*x
)) + (4*b*e*n*Log[x])/(3*d^5) - (a + b*Log[c*x^n])/(d^4*x) - (e*(a + b*Log
[c*x^n]))/(3*d^2*(d + e*x)^3) - (e*(a + b*Log[c*x^n]))/(d^3*(d + e*x)^2) +
 (3*e^2*x*(a + b*Log[c*x^n]))/(d^5*(d + e*x)) + (4*e*Log[1 + d/(e*x)]*(a +
 b*Log[c*x^n]))/d^5 - (13*b*e*n*Log[d + e*x])/(3*d^5) - (4*b*e*n*PolyLog[2
, -(d/(e*x))])/d^5
```

3.60.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.60.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.75 (sec) , antiderivative size = 370, normalized size of antiderivative = 1.75

method	result
risch	$-\frac{b\ln(x^n)e}{3d^2(ex+d)^3}+\frac{4b\ln(x^n)e\ln(ex+d)}{d^5}-\frac{3b\ln(x^n)e}{d^4(ex+d)}-\frac{b\ln(x^n)e}{d^3(ex+d)^2}-\frac{b\ln(x^n)}{d^4x}-\frac{4b\ln(x^n)e\ln(x)}{d^5}+\frac{2bne\ln(x)^2}{d^5}-\frac{4bne\ln(\cdots}{}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-1/3*b*ln(x^n)/d^2/(e*x+d)^3*e+4*b*ln(x^n)/d^5*e*ln(e*x+d)-3*b*ln(x^n)/d^4
*e/(e*x+d)-b*ln(x^n)/d^3/(e*x+d)^2*e-b*ln(x^n)/d^4/x-4*b*ln(x^n)/d^5*e*ln(
x)+2*b*n/d^5*e*ln(x)^2-4*b*n/d^5*e*ln(e*x+d)*ln(-e*x/d)-4*b*n/d^5*e*dilog(
-e*x/d)+4/3*b*e*n/d^4/(e*x+d)-13/3*b*e*n*ln(e*x+d)/d^5+1/6*b*e*n/d^3/(e*x+
d)^2-b*n/d^4/x+13/3*b*e*n*ln(x)/d^5+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csg
n(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-1/3/d^2/(e*x+d)^3*e+4
/d^5*e*ln(e*x+d)-3/d^4*e/(e*x+d)-1/d^3/(e*x+d)^2*e-1/d^4/x-4/d^5*e*ln(x))
```

3.60.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)^4x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^4*x^6 + 4*d*e^3*x^5 + 6*d^2*e^2*x^4 + 4*d^3
*e*x^3 + d^4*x^2), x)
```

3.60.6 Sympy [A] (verification not implemented)

Time = 57.44 (sec) , antiderivative size = 614, normalized size of antiderivative = 2.91

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx=\text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**4,x)
```

output
```
a*e**2*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/d**2 +
 2*a*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**
3 + 3*a*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**4
 - a/(d**4*x) + 4*a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True)
)/d**5 - 4*a*e*log(x)/d**5 - b*e**2*n*Piecewise((x/d**4, Eq(e, 0)), (-3*d/
(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - 2*e*x/(6*d**4*e + 12*d**3
*e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e) + log(d/e + x)/(3*d**3*e),
 True))/d**2 + b*e**2*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3)
, True))*log(c*x**n)/d**2 - 2*b*e**2*n*Piecewise((x/d**3, Eq(e, 0)), (-1/(
2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True
))/d**3 + 2*b*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), T
rue))*log(c*x**n)/d**3 - 3*b*e**2*n*Piecewise((x/d**2, Eq(e, 0)), (-log(x)
/(d*e) + log(d/e + x)/(d*e), True))/d**4 + 3*b*e**2*Piecewise((x/d**2, Eq(
e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/d**4 - b*n/(d**4*x) - b*log
(c*x**n)/(d**4*x) - 4*b*e**2*n*Piecewise((x/d, Eq(e, 0)), (Piecewise((-pol
ylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*lo
g(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(d)*log(1/x) -
 polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(((), (1, 1)),
 ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) -
 polylog(2, e*x*exp_polar(I*pi)/d), True))/e, True))/d**5 + 4*b*e**2*Pi...
```

3.60.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)^4x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/3*a*((12*e^3*x^3 + 30*d*e^2*x^2 + 22*d^2*e*x + 3*d^3)/(d^4*e^3*x^4 + 3*
d^5*e^2*x^3 + 3*d^6*e*x^2 + d^7*x) - 12*e*log(e*x + d)/d^5 + 12*e*log(x)/d
^5) + b*integrate((log(c) + log(x^n))/(e^4*x^6 + 4*d*e^3*x^5 + 6*d^2*e^2*x
^4 + 4*d^3*e*x^3 + d^4*x^2), x)
```

3.60.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^4x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^4*x^2), x)
```

3.60.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^4}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(d+e\,x)^4}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^4),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^4), x)
```

3.61 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx$

3.61.1 Optimal result

Integrand size = 21, antiderivative size = 263

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx =& -\frac{bn}{4d^4x^2}+\frac{4ben}{d^5x}-\frac{be^2n}{6d^4(d+ex)^2}-\frac{11be^2n}{6d^5(d+ex)}\\ &-\frac{11be^2n\log(x)}{6d^6}-\frac{a+b\log(cx^n)}{2d^4x^2}+\frac{4e(a+b\log(cx^n))}{d^5x}\\ &+\frac{e^2(a+b\log(cx^n))}{3d^3(d+ex)^3}+\frac{3e^2(a+b\log(cx^n))}{2d^4(d+ex)^2}\\ &-\frac{6e^3x(a+b\log(cx^n))}{d^6(d+ex)}-\frac{10e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^6}\\ &+\frac{47be^2n\log(d+ex)}{6d^6}+\frac{10be^2n\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^6}\end{aligned}$$

output
```
-1/4*b*n/d^4/x^2+4*b*e*n/d^5/x-1/6*b*e^2*n/d^4/(e*x+d)^2-11/6*b*e^2*n/d^5/
(e*x+d)-11/6*b*e^2*n*ln(x)/d^6+1/2*(-a-b*ln(c*x^n))/d^4/x^2+4*e*(a+b*ln(c*
x^n))/d^5/x+1/3*e^2*(a+b*ln(c*x^n))/d^3/(e*x+d)^3+3/2*e^2*(a+b*ln(c*x^n))/
d^4/(e*x+d)^2-6*e^3*x*(a+b*ln(c*x^n))/d^6/(e*x+d)-10*e^2*ln(1+d/e/x)*(a+b*
ln(c*x^n))/d^6+47/6*b*e^2*n*ln(e*x+d)/d^6+10*b*e^2*n*polylog(2,-d/e/x)/d^6
```

3.61.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 276, normalized size of antiderivative = 1.05

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx$$
$$= \frac{-\frac{3bd^2n}{x^2}+\frac{48bden}{x}-\frac{18bde^2n}{d+ex}-\frac{2bde^2n(3d+2ex)}{(d+ex)^2}-22be^2n\log(x)-\frac{6d^2(a+b\log(cx^n))}{x^2}+\frac{48de(a+b\log(cx^n))}{x}+\frac{4d^3e^2(a+b\log(}{(d+ex)^3}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)^4),x]
```

output
```
((-3*b*d^2*n)/x^2 + (48*b*d*e*n)/x - (18*b*d*e^2*n)/(d + e*x) - (2*b*d*e^2
*n*(3*d + 2*e*x))/(d + e*x)^2 - 22*b*e^2*n*Log[x] - (6*d^2*(a + b*Log[c*x^
n]))/x^2 + (48*d*e*(a + b*Log[c*x^n]))/x + (4*d^3*e^2*(a + b*Log[c*x^n]))/
(d + e*x)^3 + (18*d^2*e^2*(a + b*Log[c*x^n]))/(d + e*x)^2 + (72*d*e^2*(a +
 b*Log[c*x^n]))/(d + e*x) + (60*e^2*(a + b*Log[c*x^n])^2)/(b*n) - 72*b*e^2
*n*(Log[x] - Log[d + e*x]) + 22*b*e^2*n*Log[d + e*x] - 120*e^2*(a + b*Log[
c*x^n])*Log[1 + (e*x)/d] - 120*b*e^2*n*PolyLog[2, -((e*x)/d)])/(12*d^6)
```

3.61.3 Rubi [A] (verified)

Time = 0.57 (sec) , antiderivative size = 263, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(-\frac{6e^3(a+b\log(cx^n))}{d^5(d+ex)^2}+\frac{10e^2(a+b\log(cx^n))}{d^5x(d+ex)}-\frac{4e(a+b\log(cx^n))}{d^5x^2}-\frac{3e^3(a+b\log(cx^n))}{d^4(d+ex)^3}+\frac{a+b\log(cx^n)}{d^4x^3}\right.$$

$$\Big\downarrow \text{2009}$$

$$
\begin{aligned}
&-\frac{6e^3x(a+b\log(cx^n))}{d^6(d+ex)}-\frac{10e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^6}+\frac{4e(a+b\log(cx^n))}{d^5x}+\\
&\frac{3e^2(a+b\log(cx^n))}{2d^4(d+ex)^2}-\frac{a+b\log(cx^n)}{2d^4x^2}+\frac{e^2(a+b\log(cx^n))}{3d^3(d+ex)^3}+\frac{10be^2n\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^6}-\\
&\frac{11be^2n\log(x)}{6d^6}+\frac{47be^2n\log(d+ex)}{6d^6}-\frac{11be^2n}{6d^5(d+ex)}+\frac{4ben}{d^5x}-\frac{be^2n}{6d^4(d+ex)^2}-\frac{bn}{4d^4x^2}
\end{aligned}
$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)^4),x]
```

output
```
-1/4*(b*n)/(d^4*x^2) + (4*b*e*n)/(d^5*x) - (b*e^2*n)/(6*d^4*(d + e*x)^2) -
 (11*b*e^2*n)/(6*d^5*(d + e*x)) - (11*b*e^2*n*Log[x])/(6*d^6) - (a + b*Log
[c*x^n])/(2*d^4*x^2) + (4*e*(a + b*Log[c*x^n]))/(d^5*x) + (e^2*(a + b*Log[
c*x^n]))/(3*d^3*(d + e*x)^3) + (3*e^2*(a + b*Log[c*x^n]))/(2*d^4*(d + e*x)
^2) - (6*e^3*x*(a + b*Log[c*x^n]))/(d^6*(d + e*x)) - (10*e^2*Log[1 + d/(e*
x)]*(a + b*Log[c*x^n]))/d^6 + (47*b*e^2*n*Log[d + e*x])/(6*d^6) + (10*b*e^
2*n*PolyLog[2, -(d/(e*x))])/d^6
```

3.61.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.61.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.92 (sec) , antiderivative size = 438, normalized size of antiderivative = 1.67

method	result
risch	$-\frac{10b\ln(x^n)e^2\ln(ex+d)}{d^6}+\frac{6b\ln(x^n)e^2}{d^5(ex+d)}+\frac{3b\ln(x^n)e^2}{2d^4(ex+d)^2}+\frac{b\ln(x^n)e^2}{3d^3(ex+d)^3}-\frac{b\ln(x^n)}{2d^4x^2}+\frac{10b\ln(x^n)e^2\ln(x)}{d^6}+\frac{4b\ln(x^n)e}{d^5x}-$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-10*b*ln(x^n)/d^6*e^2*ln(e*x+d)+6*b*ln(x^n)/d^5*e^2/(e*x+d)+3/2*b*ln(x^n)/
d^4*e^2/(e*x+d)^2+1/3*b*ln(x^n)/d^3/(e*x+d)^3*e^2-1/2*b*ln(x^n)/d^4/x^2+10
*b*ln(x^n)/d^6*e^2*ln(x)+4*b*ln(x^n)/d^5*e/x-11/6*b*e^2*n/d^5/(e*x+d)+47/6
*b*e^2*n*ln(e*x+d)/d^6-1/6*b*e^2*n/d^4/(e*x+d)^2-1/4*b*n/d^4/x^2+4*b*e*n/d
^5/x-47/6*b*e^2*n*ln(x)/d^6-5*b*n/d^6*e^2*ln(x)^2+10*b*n/d^6*e^2*ln(e*x+d)
*ln(-e*x/d)+10*b*n/d^6*e^2*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n
)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-10/d^6*e^2*ln(e*
x+d)+6/d^5*e^2/(e*x+d)+3/2/d^4*e^2/(e*x+d)^2+1/3/d^3/(e*x+d)^3*e^2-1/2/d^4
/x^2+10/d^6*e^2*ln(x)+4/d^5*e/x)
```

3.61.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^3(d+ex)^4}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(ex+d\right)^4x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^4*x^7 + 4*d*e^3*x^6 + 6*d^2*e^2*x^5 + 4*d^3
*e*x^4 + d^4*x^3), x)
```

3.61.6 Sympy [A] (verification not implemented)

Time = 61.94 (sec) , antiderivative size = 668, normalized size of antiderivative = 2.54

$$\int \frac{a+b\log\left(cx^n\right)}{x^3(d+ex)^4}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**4,x)
```

output
```
-a*e**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/d**3
- 3*a*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d*
*4 - a/(2*d**4*x**2) - 6*a*e**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e
**2*x), True))/d**5 + 4*a*e/(d**5*x) - 10*a*e**3*Piecewise((x/d, Eq(e, 0))
, (log(d + e*x)/e, True))/d**6 + 10*a*e**2*log(x)/d**6 + b*e**3*n*Piecewis
e((x/d**4, Eq(e, 0)), (-3*d/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2)
 - 2*e*x/(6*d**4*e + 12*d**3*e**2*x + 6*d**2*e**3*x**2) - log(x)/(3*d**3*e
) + log(d/e + x)/(3*d**3*e), True))/d**3 - b*e**3*Piecewise((x/d**4, Eq(e,
 0)), (-1/(3*e*(d + e*x)**3), True))*log(c*x**n)/d**3 + 3*b*e**3*n*Piecewi
se((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log(x)/(2*d**2*e) + l
og(d/e + x)/(2*d**2*e), True))/d**4 - 3*b*e**3*Piecewise((x/d**3, Eq(e, 0)
), (-1/(2*e*(d + e*x)**2), True))*log(c*x**n)/d**4 - b*n/(4*d**4*x**2) - b
*log(c*x**n)/(2*d**4*x**2) + 6*b*e**3*n*Piecewise((x/d**2, Eq(e, 0)), (-lo
g(x)/(d*e) + log(d/e + x)/(d*e), True))/d**5 - 6*b*e**3*Piecewise((x/d**2,
 Eq(e, 0)), (-1/(d*e + e**2*x), True))*log(c*x**n)/d**5 + 4*b*e*n/(d**5*x)
 + 4*b*e*log(c*x**n)/(d**5*x) + 10*b*e**3*n*Piecewise((x/d, Eq(e, 0)), (Pi
ecewise((-polylog(2, e*x*exp_polar(I*pi)/d), (Abs(x) < 1) & (1/Abs(x) < 1)
), (log(d)*log(x) - polylog(2, e*x*exp_polar(I*pi)/d), Abs(x) < 1), (-log(
d)*log(1/x) - polylog(2, e*x*exp_polar(I*pi)/d), 1/Abs(x) < 1), (-meijerg(
((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, ...
```

3.61.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^4x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*a*((60*e^4*x^4 + 150*d*e^3*x^3 + 110*d^2*e^2*x^2 + 15*d^3*e*x - 3*d^4)
/(d^5*e^3*x^5 + 3*d^6*e^2*x^4 + 3*d^7*e*x^3 + d^8*x^2) - 60*e^2*log(e*x +
d)/d^6 + 60*e^2*log(x)/d^6) + b*integrate((log(c) + log(x^n))/(e^4*x^7 + 4
*d*e^3*x^6 + 6*d^2*e^2*x^5 + 4*d^3*e*x^4 + d^4*x^3), x)
```

3.61.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)^4x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^4*x^3), x)
```

3.61.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^4}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x^3\,(d+e\,x)^4}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^4),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^4), x)
```

3.62 $\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx$

3.62.1 Optimal result

Integrand size = 21, antiderivative size = 329

$$\begin{aligned}\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx =\ & \frac{28bdnx}{e^8}-\frac{d(280a+341bn)x}{10e^8}-\frac{7bnx^2}{e^7}\\ & -\frac{28bdx\log(cx^n)}{e^8}-\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}\\ & -\frac{x^7(8a+bn+8b\log(cx^n))}{30e^2(d+ex)^5}-\frac{x^6(56a+15bn+56b\log(cx^n))}{120e^3(d+ex)^4}\\ & -\frac{x^5(168a+73bn+168b\log(cx^n))}{180e^4(d+ex)^3}\\ & +\frac{x^2(280a+341bn+280b\log(cx^n))}{20e^7}\\ & -\frac{x^4(840a+533bn+840b\log(cx^n))}{360e^5(d+ex)^2}\\ & -\frac{x^3(840a+743bn+840b\log(cx^n))}{90e^6(d+ex)}\\ & +\frac{d^2(280a+341bn+280b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{10e^9}\\ & +\frac{28bd^2n\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^9}\end{aligned}$$

output
```
28*b*d*n*x/e^8-1/10*d*(341*b*n+280*a)*x/e^8-7*b*n*x^2/e^7-28*b*d*x*ln(c*x^
n)/e^8-1/6*x^8*(a+b*ln(c*x^n))/e/(e*x+d)^6-1/30*x^7*(8*a+b*n+8*b*ln(c*x^n)
)/e^2/(e*x+d)^5-1/120*x^6*(56*a+15*b*n+56*b*ln(c*x^n))/e^3/(e*x+d)^4-1/180
*x^5*(168*a+73*b*n+168*b*ln(c*x^n))/e^4/(e*x+d)^3+1/20*x^2*(280*a+341*b*n+
280*b*ln(c*x^n))/e^7-1/360*x^4*(840*a+533*b*n+840*b*ln(c*x^n))/e^5/(e*x+d)
^2-1/90*x^3*(840*a+743*b*n+840*b*ln(c*x^n))/e^6/(e*x+d)+1/10*d^2*(280*a+34
1*b*n+280*b*ln(c*x^n))*ln(1+e*x/d)/e^9+28*b*d^2*n*polylog(2,-e*x/d)/e^9
```

3.62.2 Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 403, normalized size of antiderivative = 1.22

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{-2520adex+2520bdenx+180ae^2x^2-90be^2nx^2-\frac{60ad^8}{(d+ex)^6}+\frac{576ad^7}{(d+ex)^5}+\frac{12bd^7n}{(d+ex)^5}-\frac{2520ad^6}{(d+ex)^4}-\frac{129bd^6n}{(d+ex)^4}+\frac{6720ad}{(d+ex)}}{}$$

input
```
Integrate[(x^8*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(-2520*a*d*e*x + 2520*b*d*e*n*x + 180*a*e^2*x^2 - 90*b*e^2*n*x^2 - (60*a*d
^8)/(d + e*x)^6 + (576*a*d^7)/(d + e*x)^5 + (12*b*d^7*n)/(d + e*x)^5 - (25
20*a*d^6)/(d + e*x)^4 - (129*b*d^6*n)/(d + e*x)^4 + (6720*a*d^5)/(d + e*x)
^3 + (668*b*d^5*n)/(d + e*x)^3 - (12600*a*d^4)/(d + e*x)^2 - (2358*b*d^4*n
)/(d + e*x)^2 + (20160*a*d^3)/(d + e*x) + (7884*b*d^3*n)/(d + e*x) - 12276
*b*d^2*n*Log[x] - 2520*b*d*e*x*Log[c*x^n] + 180*b*e^2*x^2*Log[c*x^n] - (60
*b*d^8*Log[c*x^n])/(d + e*x)^6 + (576*b*d^7*Log[c*x^n])/(d + e*x)^5 - (252
0*b*d^6*Log[c*x^n])/(d + e*x)^4 + (6720*b*d^5*Log[c*x^n])/(d + e*x)^3 - (1
2600*b*d^4*Log[c*x^n])/(d + e*x)^2 + (20160*b*d^3*Log[c*x^n])/(d + e*x) +
12276*b*d^2*n*Log[d + e*x] + 10080*a*d^2*Log[1 + (e*x)/d] + 10080*b*d^2*Lo
g[c*x^n]*Log[1 + (e*x)/d] + 10080*b*d^2*n*PolyLog[2, -((e*x)/d)])/(360*e^9
)
```

3.62.3 Rubi [A] (verified)

Time = 1.15 (sec) , antiderivative size = 366, normalized size of antiderivative = 1.11, number of steps used = 11, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.524, Rules used = {2784, 2784, 2784, 27, 2784, 2784, 27, 2784, 27, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}dx$$

$$\Big\downarrow \text{2784}$$

$$\frac{\int \frac{x^7(8a+bn+8b\log(cx^n))}{(d+ex)^6}dx}{6e}-\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\int \frac{x^6(56a+15bn+56b\log(cx^n))}{(d+ex)^5}dx}{5e}-\frac{x^7(8a+8b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\frac{\int \frac{2x^5(168a+73bn+168b\log(cx^n))}{(d+ex)^4}dx}{4e}-\frac{x^6(56a+56b\log(cx^n)+15bn)}{4e(d+ex)^4}}{5e}-\frac{x^7(8a+8b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{27}$$

$$\frac{\frac{\frac{\int \frac{x^5(168a+73bn+168b\log(cx^n))}{(d+ex)^4}dx}{2e}-\frac{x^6(56a+56b\log(cx^n)+15bn)}{4e(d+ex)^4}}{5e}-\frac{x^7(8a+8b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\frac{\frac{\int \frac{x^4(840a+533bn+840b\log(cx^n))}{(d+ex)^3}dx}{3e}-\frac{x^5(168a+168b\log(cx^n)+73bn)}{3e(d+ex)^3}}{2e}-\frac{x^6(56a+56b\log(cx^n)+15bn)}{4e(d+ex)^4}}{5e}-\frac{x^7(8a+8b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-$$
$$\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\frac{\frac{\frac{\int \frac{4x^3(840a+743bn+840b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^4(840a+840b\log(cx^n)+533bn)}{2e(d+ex)^2}}{3e}-\frac{x^5(168a+168b\log(cx^n)+73bn)}{3e(d+ex)^3}}{2e}-\frac{x^6(56a+56b\log(cx^n)+15bn)}{4e(d+ex)^4}}{5e}-\frac{x^7(8a+8b\log(c}{5e(d+ex)}}{6e}$$

$$\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\downarrow$ 27

$$\frac{\frac{\frac{\frac{\frac{2\int \frac{x^3(840a+743bn+840b\log(cx^n))}{(d+ex)^2}dx}{e}-\frac{x^4(840a+840b\log(cx^n)+533bn)}{2e(d+ex)^2}}{3e}-\frac{x^5(168a+168b\log(cx^n)+73bn)}{3e(d+ex)^3}}{2e}-\frac{x^6(56a+56b\log(cx^n)+15bn)}{4e(d+ex)^4}}{5e}-\frac{x^7(8a+8b\log(c}{5e(d+ex}}{6e}$$

$$\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\downarrow$ 2784

$$\frac{\frac{\frac{\frac{2\left(\frac{\int \frac{9x^2(280a+341bn+280b\log(cx^n))}{d+ex}dx}{e}-\frac{x^3(840a+840b\log(cx^n)+743bn)}{e(d+ex)}\right)}{e}-\frac{x^4(840a+840b\log(cx^n)+533bn)}{2e(d+ex)^2}}{3e}-\frac{x^5(168a+168b\log(cx^n)+73bn)}{3e(d+ex)^3}}{2e}-\frac{x^6(56a+56}{4e}}{5e}$$

$$6e$$

$$\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\downarrow$ 27

$$\frac{\frac{\frac{\frac{2\left(\frac{9\int \frac{x^2(280a+341bn+280b\log(cx^n))}{d+ex}dx}{e}-\frac{x^3(840a+840b\log(cx^n)+743bn)}{e(d+ex)}\right)}{e}-\frac{x^4(840a+840b\log(cx^n)+533bn)}{2e(d+ex)^2}}{3e}-\frac{x^5(168a+168b\log(cx^n)+73bn)}{3e(d+ex)^3}}{2e}-\frac{x^6(56a+56}{4e}}{5e}$$

$$6e$$

$$\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\downarrow$ 2793

3.62. $\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx$

$$\frac{\frac{\frac{\frac{2\left(\frac{9\int\left(\frac{(280a+341bn+280b\log(cx^n))d^2}{e^2(d+ex)}-\frac{(280a+341bn+280b\log(cx^n))d}{e^2}+\frac{x(280a+341bn+280b\log(cx^n))}{e}\right)dx}{e}-\frac{x^3(840a+840b\log(cx^n)+743bn)}{e(d+ex)}\right)}{e}-\frac{x^4(840a+8}{}}{3e}}{2e}}{5e}}{6e}$$

$$\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\big\downarrow$ 2009

$$\frac{\frac{\frac{\frac{2\left(\frac{9\left(\frac{d^2\log\left(\frac{ex}{d}+1\right)(280a+280b\log(cx^n)+341bn)}{e^3}+\frac{x^2(280a+280b\log(cx^n)+341bn)}{2e}-\frac{dx(280a+341bn)}{e^2}-\frac{280bdx\log(cx^n)}{e^2}+\frac{280bd^2n\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{280bdnx}{e^2}}{e}\right.}{e}}{3e}}{2e}}{5e}$$

$$\frac{x^8(a+b\log(cx^n))}{6e(d+ex)^6}$$

input
```
Int[(x^8*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
-1/6*(x^8*(a + b*Log[c*x^n]))/(e*(d + e*x)^6) + (-1/5*(x^7*(8*a + b*n + 8*
b*Log[c*x^n]))/(e*(d + e*x)^5) + (-1/4*(x^6*(56*a + 15*b*n + 56*b*Log[c*x^
n]))/(e*(d + e*x)^4) + (-1/3*(x^5*(168*a + 73*b*n + 168*b*Log[c*x^n]))/(e*
(d + e*x)^3) + (-1/2*(x^4*(840*a + 533*b*n + 840*b*Log[c*x^n]))/(e*(d + e*
x)^2) + (2*(-((x^3*(840*a + 743*b*n + 840*b*Log[c*x^n]))/(e*(d + e*x))) +
(9*((280*b*d*n*x)/e^2 - (d*(280*a + 341*b*n)*x)/e^2 - (70*b*n*x^2)/e - (28
0*b*d*x*Log[c*x^n])/e^2 + (x^2*(280*a + 341*b*n + 280*b*Log[c*x^n]))/(2*e)
 + (d^2*(280*a + 341*b*n + 280*b*Log[c*x^n])*Log[1 + (e*x)/d])/e^3 + (280*
b*d^2*n*PolyLog[2, -((e*x)/d)])/e^3))/e))/e)/(3*e))/(2*e))/(5*e))/(6*e)
```

3.62.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.62.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.67 (sec) , antiderivative size = 561, normalized size of antiderivative = 1.71

method	result
risch	$\frac{b\ln(x^n)x^2}{2e^7} - \frac{7b\ln(x^n)dx}{e^8} + \frac{8b\ln(x^n)d^7}{5e^9(ex+d)^5} - \frac{b\ln(x^n)d^8}{6e^9(ex+d)^6} + \frac{56b\ln(x^n)d^5}{3e^9(ex+d)^3} + \frac{28b\ln(x^n)d^2\ln(ex+d)}{e^9} + \frac{56b\ln(x^n)d^3}{e^9(ex+d)} - \frac{35b\ln}{e^9(e}$

input
```
int(x^8*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e^7*x^2-7*b*ln(x^n)/e^8*d*x+8/5*b*ln(x^n)/e^9*d^7/(e*x+d)^5-
1/6*b*ln(x^n)*d^8/e^9/(e*x+d)^6+56/3*b*ln(x^n)/e^9*d^5/(e*x+d)^3+28*b*ln(x
^n)/e^9*d^2*ln(e*x+d)+56*b*ln(x^n)/e^9*d^3/(e*x+d)-35*b*ln(x^n)/e^9*d^4/(e
*x+d)^2-7*b*ln(x^n)/e^9*d^6/(e*x+d)^4-1/4*b*n*x^2/e^7+7*b*d*n*x/e^8+29/4*b
*n/e^9*d^2+341/10*b*n/e^9*d^2*ln(e*x+d)+219/10*b*n/e^9*d^3/(e*x+d)-131/20*
b*n/e^9*d^4/(e*x+d)^2+167/90*b*n/e^9*d^5/(e*x+d)^3-43/120*b*n/e^9*d^6/(e*x
+d)^4+1/30*b*n/e^9*d^7/(e*x+d)^5-341/10*b*n/e^9*d^2*ln(e*x)-28*b*n/e^9*d^2
*ln(e*x+d)*ln(-e*x/d)-28*b*n/e^9*d^2*dilog(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*
csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/e^8*(
1/2*e*x^2-7*d*x)+8/5/e^9*d^7/(e*x+d)^5-1/6*d^8/e^9/(e*x+d)^6+56/3/e^9*d^5/
(e*x+d)^3+28/e^9*d^2*ln(e*x+d)+56/e^9*d^3/(e*x+d)-35/e^9*d^4/(e*x+d)^2-7/e
^9*d^6/(e*x+d)^4)
```

3.62.5 Fricas [F]

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{(b\log(cx^n)+a)x^8}{(ex+d)^7}\,dx$$

input
```
integrate(x^8*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
integral((b*x^8*log(c*x^n) + a*x^8)/(e^7*x^7 + 7*d*e^6*x^6 + 21*d^2*e^5*x^
5 + 35*d^3*e^4*x^4 + 35*d^4*e^3*x^3 + 21*d^5*e^2*x^2 + 7*d^6*e*x + d^7), x
)
```

3.62.6 Sympy [A] (verification not implemented)

Time = 149.76 (sec) , antiderivative size = 1686, normalized size of antiderivative = 5.12

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate(x**8*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
a*d**8*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/e**8 -
 8*a*d**7*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/e**
8 + 28*a*d**6*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))
/e**8 - 56*a*d**5*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), Tr
ue))/e**8 + 70*a*d**4*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2)
, True))/e**8 - 56*a*d**3*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x)
, True))/e**8 + 28*a*d**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True
))/e**8 - 7*a*d*x/e**8 + a*x**2/(2*e**7) - b*d**8*n*Piecewise((x/d**7, Eq(
e, 0)), (-137*d**4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 +
 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 385*d**
3*e*x/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e*
*4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 470*d**2*e**2*x**2/(
360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3
 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 270*d*e**3*x**3/(360*d**10*
e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d*
*6*e**5*x**4 + 360*d**5*e**6*x**5) - 60*e**4*x**4/(360*d**10*e + 1800*d**9
*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4
+ 360*d**5*e**6*x**5) - log(x)/(6*d**6*e) + log(d/e + x)/(6*d**6*e), True)
)/e**8 + b*d**8*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True
))*log(c*x**n)/e**8 + 8*b*d**7*n*Piecewise((x/d**6, Eq(e, 0)), (-25*d**...
```

3.62.7 Maxima [F]

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{(b\log(cx^n)+a)x^8}{(ex+d)^7}\,dx$$

input
```
integrate(x^8*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/30*a*((1680*d^3*e^5*x^5 + 7350*d^4*e^4*x^4 + 13160*d^5*e^3*x^3 + 11970*d
^6*e^2*x^2 + 5508*d^7*e*x + 1023*d^8)/(e^15*x^6 + 6*d*e^14*x^5 + 15*d^2*e^
13*x^4 + 20*d^3*e^12*x^3 + 15*d^4*e^11*x^2 + 6*d^5*e^10*x + d^6*e^9) + 840
*d^2*log(e*x + d)/e^9 + 15*(e*x^2 - 14*d*x)/e^8) + b*integrate((x^8*log(c)
 + x^8*log(x^n))/(e^7*x^7 + 7*d*e^6*x^6 + 21*d^2*e^5*x^5 + 35*d^3*e^4*x^4
+ 35*d^4*e^3*x^3 + 21*d^5*e^2*x^2 + 7*d^6*e*x + d^7), x)
```

3.62.8 Giac [F]

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{(b\log(cx^n)+a)x^8}{(ex+d)^7}\,dx$$

input
```
integrate(x^8*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^8/(e*x + d)^7, x)
```

3.62.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^8(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{x^8\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^7}\,dx$$

input
```
int((x^8*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
int((x^8*(a + b*log(c*x^n)))/(d + e*x)^7, x)
```

3.63 $\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx$

3.63.1 Optimal result

Integrand size = 21, antiderivative size = 285

$$\begin{aligned}\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx = & -\frac{7bnx}{e^7}+\frac{(140a+223bn)x}{20e^7}+\frac{7bx\log(cx^n)}{e^7}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6} \\ & -\frac{x^6(7a+bn+7b\log(cx^n))}{30e^2(d+ex)^5}-\frac{x^5(42a+13bn+42b\log(cx^n))}{120e^3(d+ex)^4} \\ & -\frac{x^2(140a+153bn+140b\log(cx^n))}{40e^6(d+ex)} \\ & -\frac{x^4(210a+107bn+210b\log(cx^n))}{360e^4(d+ex)^3} \\ & -\frac{x^3(420a+319bn+420b\log(cx^n))}{360e^5(d+ex)^2} \\ & -\frac{d(140a+223bn+140b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{20e^8} \\ & -\frac{7bdn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^8}\end{aligned}$$

output

```
-7*b*n*x/e^7+1/20*(223*b*n+140*a)*x/e^7+7*b*x*ln(c*x^n)/e^7-1/6*x^7*(a+b*l
n(c*x^n))/e/(e*x+d)^6-1/30*x^6*(7*a+b*n+7*b*ln(c*x^n))/e^2/(e*x+d)^5-1/120
*x^5*(42*a+13*b*n+42*b*ln(c*x^n))/e^3/(e*x+d)^4-1/40*x^2*(140*a+153*b*n+14
0*b*ln(c*x^n))/e^6/(e*x+d)-1/360*x^4*(210*a+107*b*n+210*b*ln(c*x^n))/e^4/(
e*x+d)^3-1/360*x^3*(420*a+319*b*n+420*b*ln(c*x^n))/e^5/(e*x+d)^2-1/20*d*(1
40*a+223*b*n+140*b*ln(c*x^n))*ln(1+e*x/d)/e^8-7*b*d*n*polylog(2,-e*x/d)/e^
8
```

3.63.2 Mathematica [A] (verified)

Time = 0.33 (sec) , antiderivative size = 356, normalized size of antiderivative = 1.25

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx =$$

$$-\frac{-360aex+360benx-\frac{60ad^7}{(d+ex)^6}+\frac{504ad^6}{(d+ex)^5}+\frac{12bd^6n}{(d+ex)^5}-\frac{1890ad^5}{(d+ex)^4}-\frac{111bd^5n}{(d+ex)^4}+\frac{4200ad^4}{(d+ex)^3}+\frac{482bd^4n}{(d+ex)^3}-\frac{6300ad^3}{(d+ex)^2}-\frac{137}{(d+}}{}$$

input
```
Integrate[(x^7*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
-1/360*(-360*a*e*x + 360*b*e*n*x - (60*a*d^7)/(d + e*x)^6 + (504*a*d^6)/(d
 + e*x)^5 + (12*b*d^6*n)/(d + e*x)^5 - (1890*a*d^5)/(d + e*x)^4 - (111*b*d
^5*n)/(d + e*x)^4 + (4200*a*d^4)/(d + e*x)^3 + (482*b*d^4*n)/(d + e*x)^3 -
 (6300*a*d^3)/(d + e*x)^2 - (1377*b*d^3*n)/(d + e*x)^2 + (7560*a*d^2)/(d +
 e*x) + (3546*b*d^2*n)/(d + e*x) - 4014*b*d*n*Log[x] - 360*b*e*x*Log[c*x^n
] - (60*b*d^7*Log[c*x^n])/(d + e*x)^6 + (504*b*d^6*Log[c*x^n])/(d + e*x)^5
 - (1890*b*d^5*Log[c*x^n])/(d + e*x)^4 + (4200*b*d^4*Log[c*x^n])/(d + e*x)
^3 - (6300*b*d^3*Log[c*x^n])/(d + e*x)^2 + (7560*b*d^2*Log[c*x^n])/(d + e*
x) + 4014*b*d*n*Log[d + e*x] + 2520*a*d*Log[1 + (e*x)/d] + 2520*b*d*Log[c*
x^n]*Log[1 + (e*x)/d] + 2520*b*d*n*PolyLog[2, -((e*x)/d)])/e^8
```

3.63.3 Rubi [A] (verified)

Time = 1.09 (sec) , antiderivative size = 324, normalized size of antiderivative = 1.14, number of steps used = 11, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.524, Rules used = {2784, 2784, 2784, 2784, 27, 2784, 27, 2784, 27, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx$$

$$\Big\downarrow \text{2784}$$

$$\frac{\int \frac{x^6(7a+bn+7b\log(cx^n))}{(d+ex)^6}dx}{6e}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{\int \frac{x^5(42a+13bn+42b\log(cx^n))}{(d+ex)^5}dx}{5e}-\frac{x^6(7a+7b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \ 2784$$

$$\frac{\frac{\frac{\int \frac{x^4(210a+107bn+210b\log(cx^n))}{(d+ex)^4}dx}{4e}-\frac{x^5(42a+42b\log(cx^n)+13bn)}{4e(d+ex)^4}}{5e}-\frac{x^6(7a+7b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \ 2784$$

$$\frac{\frac{\frac{\frac{\int \frac{2x^3(420a+319bn+420b\log(cx^n))}{(d+ex)^3}dx}{3e}-\frac{x^4(210a+210b\log(cx^n)+107bn)}{3e(d+ex)^3}}{4e}-\frac{x^5(42a+42b\log(cx^n)+13bn)}{4e(d+ex)^4}}{5e}-\frac{x^6(7a+7b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \ 27$$

$$\frac{\frac{\frac{\frac{2\int \frac{x^3(420a+319bn+420b\log(cx^n))}{(d+ex)^3}dx}{3e}-\frac{x^4(210a+210b\log(cx^n)+107bn)}{3e(d+ex)^3}}{4e}-\frac{x^5(42a+42b\log(cx^n)+13bn)}{4e(d+ex)^4}}{5e}-\frac{x^6(7a+7b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \ 2784$$

$$\frac{\frac{\frac{2\left(\frac{\int \frac{9x^2(140a+153bn+140b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^3(420a+420b\log(cx^n)+319bn)}{2e(d+ex)^2}\right)}{3e}-\frac{x^4(210a+210b\log(cx^n)+107bn)}{3e(d+ex)^3}}{4e}-\frac{x^5(42a+42b\log(cx^n)+13bn)}{4e(d+ex)^4}}{5e}-\frac{x^6(7a+7b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$$\Big\downarrow \ 27$$

$$\frac{\frac{\frac{2\left(\frac{9\int \frac{x^2(140a+153bn+140b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^3(420a+420b\log(cx^n)+319bn)}{2e(d+ex)^2}\right)}{3e}-\frac{x^4(210a+210b\log(cx^n)+107bn)}{3e(d+ex)^3}}{4e}-\frac{x^5(42a+42b\log(cx^n)+13bn)}{4e(d+ex)^4}}{5e}-\frac{x^6(7a+7b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

3.63. $\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx$

$\downarrow$ 2784

$$\frac{\frac{\frac{2\left(\frac{9\left(\frac{\int \frac{2x(140a+223bn+140b\log(cx^n))}{d+ex}dx}{e}-\frac{x^2(140a+140b\log(cx^n)+153bn)}{e(d+ex)}\right)}{2e}-\frac{x^3(420a+420b\log(cx^n)+319bn)}{2e(d+ex)^2}\right)}{3e}-\frac{x^4(210a+210b\log(cx^n)+107bn)}{3e(d+ex)^3}}{4e}-\frac{x^5(42\ldots}{\ldots}}{5e} \ldots}{6e}$$

$$\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\downarrow$ 27

$$\frac{\frac{\frac{2\left(\frac{9\left(\frac{2\int \frac{x(140a+223bn+140b\log(cx^n))}{d+ex}dx}{e}-\frac{x^2(140a+140b\log(cx^n)+153bn)}{e(d+ex)}\right)}{2e}-\frac{x^3(420a+420b\log(cx^n)+319bn)}{2e(d+ex)^2}\right)}{3e}-\frac{x^4(210a+210b\log(cx^n)+107bn)}{3e(d+ex)^3}}{4e}-\frac{x^5(42\ldots}{\ldots}}{5e} \ldots}{6e}$$

$$\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\downarrow$ 2793

$$\frac{\frac{\frac{2\left(\frac{9\left(\frac{2\int\left(\frac{140a+223bn+140b\log(cx^n)}{e}-\frac{d(140a+223bn+140b\log(cx^n))}{e(d+ex)}\right)dx}{e}-\frac{x^2(140a+140b\log(cx^n)+153bn)}{e(d+ex)}\right)}{2e}-\frac{x^3(420a+420b\log(cx^n)+319bn)}{2e(d+ex)^2}\right)}{3e}-\frac{x^4(210a\ldots}{\ldots}}{4e} \ldots}{5e} \ldots}{6e}$$

$$\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\downarrow$ 2009

3.63. $\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx$

$$\frac{\frac{\frac{2\left(\frac{9\left(\frac{2\left(-\frac{d\log\left(\frac{ex}{d}+1\right)(140a+140b\log(cx^n)+223bn)}{e^2}+\frac{x(140a+223bn)}{e}+\frac{140bx\log(cx^n)}{e}-\frac{140bdn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{140bnx}{e}\right)}{e}-\frac{x^2(140a+140b\log(cx^n)+153bn}{e(d+ex)}}{2e}\right.}{3e}}{4e}}{5e}}{6e}$$

$$\frac{x^7(a+b\log(cx^n))}{6e(d+ex)^6}$$

input
```
Int[(x^7*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
-1/6*(x^7*(a + b*Log[c*x^n]))/(e*(d + e*x)^6) + (-1/5*(x^6*(7*a + b*n + 7*
b*Log[c*x^n]))/(e*(d + e*x)^5) + (-1/4*(x^5*(42*a + 13*b*n + 42*b*Log[c*x^
n]))/(e*(d + e*x)^4) + (-1/3*(x^4*(210*a + 107*b*n + 210*b*Log[c*x^n]))/(e
*(d + e*x)^3) + (2*(-1/2*(x^3*(420*a + 319*b*n + 420*b*Log[c*x^n]))/(e*(d
+ e*x)^2) + (9*(-((x^2*(140*a + 153*b*n + 140*b*Log[c*x^n]))/(e*(d + e*x))
) + (2*((-140*b*n*x)/e + ((140*a + 223*b*n)*x)/e + (140*b*x*Log[c*x^n])/e
- (d*(140*a + 223*b*n + 140*b*Log[c*x^n])*Log[1 + (e*x)/d])/e^2 - (140*b*d
*n*PolyLog[2, -((e*x)/d)])/e^2))/e))/(2*e)))/(3*e))/(4*e))/(5*e))/(6*e)
```

3.63.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.63.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.34 (sec) , antiderivative size = 511, normalized size of antiderivative = 1.79

method	result
risch	$\frac{b\ln(x^n)x}{e^7}+\frac{b\ln(x^n)d^7}{6e^8(ex+d)^6}-\frac{35b\ln(x^n)d^4}{3e^8(ex+d)^3}-\frac{7b\ln(x^n)d\ln(ex+d)}{e^8}-\frac{21b\ln(x^n)d^2}{e^8(ex+d)}+\frac{35b\ln(x^n)d^3}{2e^8(ex+d)^2}+\frac{21b\ln(x^n)d^5}{4e^8(ex+d)^4}-\frac{7b\ln(x}{5e^8(ex}$

input
```
int(x^7*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e^7*x+1/6*b*ln(x^n)/e^8*d^7/(e*x+d)^6-35/3*b*ln(x^n)/e^8*d^4/(e*
x+d)^3-7*b*ln(x^n)/e^8*d*ln(e*x+d)-21*b*ln(x^n)/e^8*d^2/(e*x+d)+35/2*b*ln(
x^n)/e^8*d^3/(e*x+d)^2+21/4*b*ln(x^n)/e^8*d^5/(e*x+d)^4-7/5*b*ln(x^n)/e^8*
d^6/(e*x+d)^5-b*n*x/e^7-b*n/e^8*d-223/20*b*n/e^8*d*ln(e*x+d)-197/20*b*n/e^
8*d^2/(e*x+d)+153/40*b*n/e^8*d^3/(e*x+d)^2-241/180*b*n/e^8*d^4/(e*x+d)^3+3
7/120*b*n/e^8*d^5/(e*x+d)^4-1/30*b*n/e^8*d^6/(e*x+d)^5+223/20*b*n/e^8*d*ln
(e*x)+7*b*n/e^8*d*ln(e*x+d)*ln(-e*x/d)+7*b*n/e^8*d*dilog(-e*x/d)+(-1/2*I*b
*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)
^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(
c)+a)*(x/e^7+1/6/e^8*d^7/(e*x+d)^6-35/3/e^8*d^4/(e*x+d)^3-7/e^8*d*ln(e*x+d
)-21/e^8*d^2/(e*x+d)+35/2/e^8*d^3/(e*x+d)^2+21/4/e^8*d^5/(e*x+d)^4-7/5/e^8
*d^6/(e*x+d)^5)
```

3.63.5 Fricas [F]

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx=\int \frac{(b\log(cx^n)+a)x^7}{(ex+d)^7}\,dx$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
integral((b*x^7*log(c*x^n) + a*x^7)/(e^7*x^7 + 7*d*e^6*x^6 + 21*d^2*e^5*x^
5 + 35*d^3*e^4*x^4 + 35*d^4*e^3*x^3 + 21*d^5*e^2*x^2 + 7*d^6*e*x + d^7), x
)
```

3.63.6 Sympy [A] (verification not implemented)

Time = 112.19 (sec) , antiderivative size = 1632, normalized size of antiderivative = 5.73

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate(x**7*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
-a*d**7*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/e**7
+ 7*a*d**6*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/e*
*7 - 21*a*d**5*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True)
)/e**7 + 35*a*d**4*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), T
rue))/e**7 - 35*a*d**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2
), True))/e**7 + 21*a*d**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x
), True))/e**7 - 7*a*d*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/
e**7 + a*x/e**7 + b*d**7*n*Piecewise((x/d**7, Eq(e, 0)), (-137*d**4/(360*d
**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 18
00*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 385*d**3*e*x/(360*d**10*e + 1800
*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*
x**4 + 360*d**5*e**6*x**5) - 470*d**2*e**2*x**2/(360*d**10*e + 1800*d**9*e
**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 +
360*d**5*e**6*x**5) - 270*d*e**3*x**3/(360*d**10*e + 1800*d**9*e**2*x + 36
00*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e
**6*x**5) - 60*e**4*x**4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*
x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - l
og(x)/(6*d**6*e) + log(d/e + x)/(6*d**6*e), True))/e**7 - b*d**7*Piecewise
((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))*log(c*x**n)/e**7 - 7*b
*d**6*n*Piecewise((x/d**6, Eq(e, 0)), (-25*d**3/(60*d**8*e + 240*d**7*e...
```

3.63.7 Maxima [F]

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{(b\log(cx^n)+a)x^7}{(ex+d)^7}\,dx$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
-1/60*a*((1260*d^2*e^5*x^5 + 5250*d^3*e^4*x^4 + 9100*d^4*e^3*x^3 + 8085*d^
5*e^2*x^2 + 3654*d^6*e*x + 669*d^7)/(e^14*x^6 + 6*d*e^13*x^5 + 15*d^2*e^12
*x^4 + 20*d^3*e^11*x^3 + 15*d^4*e^10*x^2 + 6*d^5*e^9*x + d^6*e^8) - 60*x/e
^7 + 420*d*log(e*x + d)/e^8) + b*integrate((x^7*log(c) + x^7*log(x^n))/(e^
7*x^7 + 7*d*e^6*x^6 + 21*d^2*e^5*x^5 + 35*d^3*e^4*x^4 + 35*d^4*e^3*x^3 + 2
1*d^5*e^2*x^2 + 7*d^6*e*x + d^7), x)
```

3.63.8 Giac [F]

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{(b\log(cx^n)+a)x^7}{(ex+d)^7}\,dx$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^7/(e*x + d)^7, x)
```

3.63.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{x^7\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^7}\,dx$$

input
```
int((x^7*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
int((x^7*(a + b*log(c*x^n)))/(d + e*x)^7, x)
```

3.64 $\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7} dx$

3.64.1 Optimal result

Integrand size = 21, antiderivative size = 243

$$\begin{aligned}\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx =& -\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}-\frac{x^5(6a+bn+6b\log(cx^n))}{30e^2(d+ex)^5}\\ &-\frac{x^2(20a+19bn+20b\log(cx^n))}{40e^5(d+ex)^2}\\ &-\frac{x(20a+29bn+20b\log(cx^n))}{20e^6(d+ex)}\\ &-\frac{x^4(30a+11bn+30b\log(cx^n))}{120e^3(d+ex)^4}\\ &-\frac{x^3(60a+37bn+60b\log(cx^n))}{180e^4(d+ex)^3}\\ &+\frac{(20a+49bn+20b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{20e^7}\\ &+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^7}\end{aligned}$$

output
```
-1/6*x^6*(a+b*ln(c*x^n))/e/(e*x+d)^6-1/30*x^5*(6*a+b*n+6*b*ln(c*x^n))/e^2/
(e*x+d)^5-1/40*x^2*(20*a+19*b*n+20*b*ln(c*x^n))/e^5/(e*x+d)^2-1/20*x*(20*a
+29*b*n+20*b*ln(c*x^n))/e^6/(e*x+d)-1/120*x^4*(30*a+11*b*n+30*b*ln(c*x^n))
/e^3/(e*x+d)^4-1/180*x^3*(60*a+37*b*n+60*b*ln(c*x^n))/e^4/(e*x+d)^3+1/20*(
20*a+49*b*n+20*b*ln(c*x^n))*ln(1+e*x/d)/e^7+b*n*polylog(2,-e*x/d)/e^7
```

3.64.2 Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 333, normalized size of antiderivative = 1.37

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{-882bn\log(x) + \frac{-60ad^6+432ad^5(d+ex)+12bd^5n(d+ex)-1350ad^4(d+ex)^2-93bd^4n(d+ex)^2+2400ad^3(d+ex)^3+326bd^3n(d+ex)^3-2700\ldots}{}}{}$$

input
```
Integrate[(x^6*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(-882*b*n*Log[x] + (-60*a*d^6 + 432*a*d^5*(d + e*x) + 12*b*d^5*n*(d + e*x)
 - 1350*a*d^4*(d + e*x)^2 - 93*b*d^4*n*(d + e*x)^2 + 2400*a*d^3*(d + e*x)^
3 + 326*b*d^3*n*(d + e*x)^3 - 2700*a*d^2*(d + e*x)^4 - 711*b*d^2*n*(d + e*
x)^4 + 2160*a*d*(d + e*x)^5 + 1278*b*d*n*(d + e*x)^5 - 60*b*d^6*Log[c*x^n]
 + 432*b*d^5*(d + e*x)*Log[c*x^n] - 1350*b*d^4*(d + e*x)^2*Log[c*x^n] + 24
00*b*d^3*(d + e*x)^3*Log[c*x^n] - 2700*b*d^2*(d + e*x)^4*Log[c*x^n] + 2160
*b*d*(d + e*x)^5*Log[c*x^n] + 882*b*n*(d + e*x)^6*Log[d + e*x] + 360*a*(d
+ e*x)^6*Log[1 + (e*x)/d] + 360*b*(d + e*x)^6*Log[c*x^n]*Log[1 + (e*x)/d])
/(d + e*x)^6 + 360*b*n*PolyLog[2, -((e*x)/d)])/(360*e^7)
```

3.64.3 Rubi [A] (verified)

Time = 1.00 (sec) , antiderivative size = 279, normalized size of antiderivative = 1.15, number of steps used = 11, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.524$, Rules used = {2784, 2784, 2784, 27, 2784, 27, 2784, 27, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$\Big\downarrow \; 2784$$
$$\frac{\int \frac{x^5(6a+bn+6b\log(cx^n))}{(d+ex)^6}dx}{6e} - \frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$
$$\Big\downarrow \; 2784$$

$$\frac{\frac{\int \frac{x^4(30a+11bn+30b\log(cx^n))}{(d+ex)^5}dx}{5e}-\frac{x^5(6a+6b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 2784

$$\frac{\frac{\frac{\int \frac{2x^3(60a+37bn+60b\log(cx^n))}{(d+ex)^4}dx}{4e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}-\frac{x^5(6a+6b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 27

$$\frac{\frac{\frac{\int \frac{x^3(60a+37bn+60b\log(cx^n))}{(d+ex)^4}dx}{2e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}-\frac{x^5(6a+6b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 2784

$$\frac{\frac{\frac{\frac{\int \frac{9x^2(20a+19bn+20b\log(cx^n))}{(d+ex)^3}dx}{3e}-\frac{x^3(60a+60b\log(cx^n)+37bn)}{3e(d+ex)^3}}{2e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}-\frac{x^5(6a+6b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 27

$$\frac{\frac{\frac{\frac{3\int \frac{x^2(20a+19bn+20b\log(cx^n))}{(d+ex)^3}dx}{e}-\frac{x^3(60a+60b\log(cx^n)+37bn)}{3e(d+ex)^3}}{2e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}-\frac{x^5(6a+6b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 2784

$$\frac{\frac{\frac{\frac{3\left(\frac{\int \frac{2x(20a+29bn+20b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^2(20a+20b\log(cx^n)+19bn)}{2e(d+ex)^2}\right)}{e}-\frac{x^3(60a+60b\log(cx^n)+37bn)}{3e(d+ex)^3}}{2e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}-\frac{x^5(6a+6b\log(cx^n)+bn)}{5e(d+ex)^5}}{6e}-\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\Big\downarrow$ 27

3.64. $\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx$

$$\frac{\frac{\frac{\frac{3\left(\frac{\int \frac{x(20a+29bn+20b\log(cx^n))}{(d+ex)^2}dx}{e}-\frac{x^2(20a+20b\log(cx^n)+19bn)}{2e(d+ex)^2}\right)}{e}-\frac{x^3(60a+60b\log(cx^n)+37bn)}{3e(d+ex)^3}}{2e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}-\frac{x^5(6a+6b\log(cx^n)+b}{5e(d+ex)^5}}{6e}$$

$$\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\big\downarrow$ 2784

$$\frac{\frac{\frac{\frac{3\left(\frac{\frac{\int \frac{20a+49bn+20b\log(cx^n)}{d+ex}dx}{e}-\frac{x(20a+20b\log(cx^n)+29bn)}{e(d+ex)}}{e}-\frac{x^2(20a+20b\log(cx^n)+19bn)}{2e(d+ex)^2}\right)}{e}-\frac{x^3(60a+60b\log(cx^n)+37bn)}{3e(d+ex)^3}}{2e}-\frac{x^4(30a+30b\log(cx^n)+11bn)}{4e(d+ex)^4}}{5e}}{6e}$$

$$\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\big\downarrow$ 2754

$$\frac{\frac{\frac{3\left(\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(20a+20b\log(cx^n)+49bn)}{e}-\frac{20bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x(20a+20b\log(cx^n)+29bn)}{e(d+ex)}}{e}-\frac{x^2(20a+20b\log(cx^n)+19bn)}{2e(d+ex)^2}\right)}{e}-\frac{x^3(60a+60b\log(cx^n)+37bn)}{3e(d+ex)^3}}{2e}}{5e}}{6e}$$

$$\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

$\big\downarrow$ 2838

$$\frac{\frac{\frac{3\left(\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(20a+20b\log(cx^n)+49bn)}{e}+\frac{20bn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e}-\frac{x(20a+20b\log(cx^n)+29bn)}{e(d+ex)}}{e}-\frac{x^2(20a+20b\log(cx^n)+19bn)}{2e(d+ex)^2}\right)}{e}-\frac{x^3(60a+60b\log(cx^n)+37bn)}{3e(d+ex)^3}}{2e}}{5e}}{6e}$$

$$\frac{x^6(a+b\log(cx^n))}{6e(d+ex)^6}$$

input

```
Int[(x^6*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

3.64. $\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx$

output
```
-1/6*(x^6*(a + b*Log[c*x^n]))/(e*(d + e*x)^6) + (-1/5*(x^5*(6*a + b*n + 6*
b*Log[c*x^n]))/(e*(d + e*x)^5) + (-1/4*(x^4*(30*a + 11*b*n + 30*b*Log[c*x^
n]))/(e*(d + e*x)^4) + (-1/3*(x^3*(60*a + 37*b*n + 60*b*Log[c*x^n]))/(e*(d
 + e*x)^3) + (3*(-1/2*(x^2*(20*a + 19*b*n + 20*b*Log[c*x^n]))/(e*(d + e*x)
^2) + (-((x*(20*a + 29*b*n + 20*b*Log[c*x^n]))/(e*(d + e*x))) + (((20*a +
49*b*n + 20*b*Log[c*x^n])*Log[1 + (e*x)/d])/e + (20*b*n*PolyLog[2, -((e*x)
/d)])/e)/e)/e))/e)/(2*e))/(5*e))/(6*e)
```

3.64.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.64.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.30 (sec) , antiderivative size = 466, normalized size of antiderivative = 1.92

method	result
risch	$-\frac{b\ln(x^n)d^6}{6e^7(ex+d)^6}+\frac{20b\ln(x^n)d^3}{3e^7(ex+d)^3}+\frac{b\ln(x^n)\ln(ex+d)}{e^7}+\frac{6b\ln(x^n)d}{e^7(ex+d)}-\frac{15b\ln(x^n)d^2}{2e^7(ex+d)^2}-\frac{15b\ln(x^n)d^4}{4e^7(ex+d)^4}+\frac{6b\ln(x^n)d^5}{5e^7(ex+d)^5}+\frac{71b}{20e^7(e}$

input
```
int(x^6*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
-1/6*b*ln(x^n)/e^7*d^6/(e*x+d)^6+20/3*b*ln(x^n)/e^7*d^3/(e*x+d)^3+b*ln(x^n
)/e^7*ln(e*x+d)+6*b*ln(x^n)/e^7*d/(e*x+d)-15/2*b*ln(x^n)/e^7*d^2/(e*x+d)^2
-15/4*b*ln(x^n)/e^7*d^4/(e*x+d)^4+6/5*b*ln(x^n)/e^7*d^5/(e*x+d)^5+71/20*b*
n/e^7*d/(e*x+d)+49/20*b*n/e^7*ln(e*x+d)-79/40*b*n/e^7*d^2/(e*x+d)^2+163/18
0*b*n/e^7*d^3/(e*x+d)^3-31/120*b*n/e^7*d^4/(e*x+d)^4+1/30*b*n/e^7*d^5/(e*x
+d)^5-49/20*b*n/e^7*ln(e*x)-b*n/e^7*ln(e*x+d)*ln(-e*x/d)-b*n/e^7*dilog(-e*
x/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)
*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*
c*x^n)^3+b*ln(c)+a)*(-1/6/e^7*d^6/(e*x+d)^6+20/3/e^7*d^3/(e*x+d)^3+1/e^7*l
n(e*x+d)+6/e^7*d/(e*x+d)-15/2/e^7*d^2/(e*x+d)^2-15/4/e^7*d^4/(e*x+d)^4+6/5
/e^7*d^5/(e*x+d)^5)
```

3.64.5 Fricas [F]

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{(b\log(cx^n)+a)x^6}{(ex+d)^7}\,dx$$

input
```
integrate(x^6*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
integral((b*x^6*log(c*x^n) + a*x^6)/(e^7*x^7 + 7*d*e^6*x^6 + 21*d^2*e^5*x^
5 + 35*d^3*e^4*x^4 + 35*d^4*e^3*x^3 + 21*d^5*e^2*x^2 + 7*d^6*e*x + d^7), x
)
```

3.64.6 Sympy [A] (verification not implemented)

Time = 80.64 (sec) , antiderivative size = 1588, normalized size of antiderivative = 6.53

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate(x**6*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
a*d**6*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/e**6 -
 6*a*d**5*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/e**
6 + 15*a*d**4*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))
/e**6 - 20*a*d**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), Tr
ue))/e**6 + 15*a*d**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2)
, True))/e**6 - 6*a*d*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), Tr
ue))/e**6 + a*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)/e, True))/e**6 - b*
d**6*n*Piecewise((x/d**7, Eq(e, 0)), (-137*d**4/(360*d**10*e + 1800*d**9*e
**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 +
360*d**5*e**6*x**5) - 385*d**3*e*x/(360*d**10*e + 1800*d**9*e**2*x + 3600*
d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6
*x**5) - 470*d**2*e**2*x**2/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e*
*3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5)
- 270*d*e**3*x**3/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 +
3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 60*e**4*
x**4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**
4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - log(x)/(6*d**6*e) + l
og(d/e + x)/(6*d**6*e), True))/e**6 + b*d**6*Piecewise((x/d**7, Eq(e, 0)),
 (-1/(6*e*(d + e*x)**6), True))*log(c*x**n)/e**6 + 6*b*d**5*n*Piecewise((x
/d**6, Eq(e, 0)), (-25*d**3/(60*d**8*e + 240*d**7*e**2*x + 360*d**6*e**...
```

3.64.7 Maxima [F(-1)]

Timed out.

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx = \text{Timed out}$$

input
```
integrate(x^6*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
Timed out
```

3.64.8 Giac [F]

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{(b\log(cx^n)+a)x^6}{(ex+d)^7}\,dx$$

input
```
integrate(x^6*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^6/(e*x + d)^7, x)
```

3.64.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex)^7}\,dx = \int \frac{x^6\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^7}\,dx$$

input
```
int((x^6*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
int((x^6*(a + b*log(c*x^n)))/(d + e*x)^7, x)
```

3.65 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx$

3.65.1 Optimal result

Integrand size = 21, antiderivative size = 136

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{bd^4n}{30e^6(d+ex)^5}+\frac{5bd^3n}{24e^6(d+ex)^4}-\frac{5bd^2n}{9e^6(d+ex)^3}+\frac{5bdn}{6e^6(d+ex)^2}-\frac{5bn}{6e^6(d+ex)}+\frac{x^6(a+b\log(cx^n))}{6d(d+ex)^6}-\frac{bn\log(d+ex)}{6de^6}$$

output
```
-1/30*b*d^4*n/e^6/(e*x+d)^5+5/24*b*d^3*n/e^6/(e*x+d)^4-5/9*b*d^2*n/e^6/(e*
x+d)^3+5/6*b*d*n/e^6/(e*x+d)^2-5/6*b*n/e^6/(e*x+d)+1/6*x^6*(a+b*ln(c*x^n))
/d/(e*x+d)^6-1/6*b*n*ln(e*x+d)/d/e^6
```

3.65.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 335 vs. 2(136) = 272.

Time = 0.19 (sec) , antiderivative size = 335, normalized size of antiderivative = 2.46

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{60ad^6+137bd^6n+360ad^5ex+762bd^5enx+900ad^4e^2x^2+1725bd^4e^2nx^2+1200ad^3e^3x^3+2000bd^3e^3n}{}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
-1/360*(60*a*d^6 + 137*b*d^6*n + 360*a*d^5*e*x + 762*b*d^5*e*n*x + 900*a*d
^4*e^2*x^2 + 1725*b*d^4*e^2*n*x^2 + 1200*a*d^3*e^3*x^3 + 2000*b*d^3*e^3*n*
x^3 + 900*a*d^2*e^4*x^4 + 1200*b*d^2*e^4*n*x^4 + 360*a*d*e^5*x^5 + 300*b*d
*e^5*n*x^5 - 60*b*n*(d + e*x)^6*Log[x] + 60*b*d*(d^5 + 6*d^4*e*x + 15*d^3*
e^2*x^2 + 20*d^2*e^3*x^3 + 15*d*e^4*x^4 + 6*e^5*x^5)*Log[c*x^n] + 60*b*d^6
*n*Log[d + e*x] + 360*b*d^5*e*n*x*Log[d + e*x] + 900*b*d^4*e^2*n*x^2*Log[d
 + e*x] + 1200*b*d^3*e^3*n*x^3*Log[d + e*x] + 900*b*d^2*e^4*n*x^4*Log[d +
e*x] + 360*b*d*e^5*n*x^5*Log[d + e*x] + 60*b*e^6*n*x^6*Log[d + e*x])/(d*e^
6*(d + e*x)^6)
```

3.65.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 127, normalized size of antiderivative = 0.93, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2773, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}dx$$

$$\Big\downarrow \text{ 2773}$$

$$\frac{x^6(a+b\log(cx^n))}{6d(d+ex)^6}-\frac{bn\int \frac{x^5}{(d+ex)^6}dx}{6d}$$

$$\Big\downarrow \text{ 49}$$

$$\frac{x^6(a+b\log(cx^n))}{6d(d+ex)^6}-\frac{bn\int \left(-\frac{d^5}{e^5(d+ex)^6}+\frac{5d^4}{e^5(d+ex)^5}-\frac{10d^3}{e^5(d+ex)^4}+\frac{10d^2}{e^5(d+ex)^3}-\frac{5d}{e^5(d+ex)^2}+\frac{1}{e^5(d+ex)}\right)dx}{6d}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{x^6(a+b\log(cx^n))}{6d(d+ex)^6}-\frac{bn\left(\frac{d^5}{5e^6(d+ex)^5}-\frac{5d^4}{4e^6(d+ex)^4}+\frac{10d^3}{3e^6(d+ex)^3}-\frac{5d^2}{e^6(d+ex)^2}+\frac{5d}{e^6(d+ex)}+\frac{\log(d+ex)}{e^6}\right)}{6d}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(x^6*(a + b*Log[c*x^n]))/(6*d*(d + e*x)^6) - (b*n*(d^5/(5*e^6*(d + e*x)^5)
 - (5*d^4)/(4*e^6*(d + e*x)^4) + (10*d^3)/(3*e^6*(d + e*x)^3) - (5*d^2)/(e
^6*(d + e*x)^2) + (5*d)/(e^6*(d + e*x)) + Log[d + e*x]/e^6))/(6*d)
```

3.65.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

3.65.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 394 vs. $2(122) = 244$.

Time = 1.50 (sec) , antiderivative size = 395, normalized size of antiderivative = 2.90

method	result
parallelrisch	$\frac{-900\ln(ex+d)b\,d^2e^4n\,x^4+50b\,e^6n\,x^6-900\ln(ex+d)b\,d^4e^2n\,x^2-87b\,d^6n-360x\ln(c\,x^n)b\,d^5e-900x^2\ln(c\,x^n)b\,d^4e^2-1200x^3\ln}{}$
risch	Expression too large to display

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/360*(-900*ln(e*x+d)*b*d^2*e^4*n*x^4+50*b*e^6*n*x^6-900*ln(e*x+d)*b*d^4*e
^2*n*x^2-87*b*d^6*n-360*x*ln(c*x^n)*b*d^5*e-900*x^2*ln(c*x^n)*b*d^4*e^2-12
00*x^3*ln(c*x^n)*b*d^3*e^3-900*x^4*ln(c*x^n)*b*d^2*e^4-360*x^5*ln(c*x^n)*b
*d*e^5+60*ln(x)*x^6*b*e^6*n-1200*ln(e*x+d)*b*d^3*e^3*n*x^3-360*ln(e*x+d)*b
*d*e^5*n*x^5-975*b*d^4*e^2*n*x^2-450*b*d^2*e^4*n*x^4-1000*b*d^3*e^3*n*x^3-
462*b*d^5*e*n*x-360*ln(e*x+d)*b*d^5*e*n*x-60*ln(e*x+d)*b*e^6*n*x^6-60*ln(c
*x^n)*b*d^6-60*ln(e*x+d)*b*d^6*n+60*a*e^6*x^6+1200*ln(x)*x^3*b*d^3*e^3*n+9
00*ln(x)*x^2*b*d^4*e^2*n+360*ln(x)*x*b*d^5*e*n+360*ln(x)*x^5*b*d*e^5*n+900
*ln(x)*x^4*b*d^2*e^4*n+60*ln(x)*b*d^6*n)/d/e^6/(e*x+d)^6
```

3.65.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 361 vs. $2(122) = 244$.

Time = 0.31 (sec) , antiderivative size = 361, normalized size of antiderivative = 2.65

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{60\,be^6nx^6\log(x) - 137\,bd^6n - 60\,ad^6 - 60\,(5\,bde^5n + 6\,ade^5)x^5 - 300\,(4\,bd^2e^4n + 3\,ad^2e^4)x^4 - 400\,(5\,bd^3}{}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
1/360*(60*b*e^6*n*x^6*log(x) - 137*b*d^6*n - 60*a*d^6 - 60*(5*b*d*e^5*n +
6*a*d*e^5)*x^5 - 300*(4*b*d^2*e^4*n + 3*a*d^2*e^4)*x^4 - 400*(5*b*d^3*e^3*
n + 3*a*d^3*e^3)*x^3 - 75*(23*b*d^4*e^2*n + 12*a*d^4*e^2)*x^2 - 6*(127*b*d
^5*e*n + 60*a*d^5*e)*x - 60*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*
n*x^4 + 20*b*d^3*e^3*n*x^3 + 15*b*d^4*e^2*n*x^2 + 6*b*d^5*e*n*x + b*d^6*n)
*log(e*x + d) - 60*(6*b*d*e^5*x^5 + 15*b*d^2*e^4*x^4 + 20*b*d^3*e^3*x^3 +
15*b*d^4*e^2*x^2 + 6*b*d^5*e*x + b*d^6)*log(c))/(d*e^12*x^6 + 6*d^2*e^11*x
^5 + 15*d^3*e^10*x^4 + 20*d^4*e^9*x^3 + 15*d^5*e^8*x^2 + 6*d^6*e^7*x + d^7
*e^6)
```

3.65.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1911 vs. $2(133) = 266$.

Time = 75.71 (sec) , antiderivative size = 1911, normalized size of antiderivative = 14.05

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
Piecewise((zoo*(-a/x - b*n/x - b*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((a
*x**6/6 - b*n*x**6/36 + b*x**6*log(c*x**n)/6)/d**7, Eq(e, 0)), ((-a/x - b*
n/x - b*log(c*x**n)/x)/e**7, Eq(d, 0)), (-60*a*d**6/(360*d**7*e**6 + 2160*
d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*
x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 360*a*d**5*e*x/(360*d**7
*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 540
0*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 900*a*d**4*
e**2*x**2/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d
**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*
x**6) - 1200*a*d**3*e**3*x**3/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**
5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11
*x**5 + 360*d*e**12*x**6) - 900*a*d**2*e**4*x**4/(360*d**7*e**6 + 2160*d**
6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**
4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 360*a*d*e**5*x**5/(360*d**7
*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 7200*d**4*e**9*x**3 + 540
0*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e**12*x**6) - 60*b*d**6*n
*log(d/e + x)/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**8*x**2 + 72
00*d**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x**5 + 360*d*e*
*12*x**6) - 137*b*d**6*n/(360*d**7*e**6 + 2160*d**6*e**7*x + 5400*d**5*e**
8*x**2 + 7200*d**4*e**9*x**3 + 5400*d**3*e**10*x**4 + 2160*d**2*e**11*x...
```

3.65.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 377 vs. $2(122) = 244$.

Time = 0.23 (sec) , antiderivative size = 377, normalized size of antiderivative = 2.77

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{1}{360}\,bn\left(\frac{300\,e^4x^4 + 900\,de^3x^3 + 1100\,d^2e^2x^2 + 625\,d^3ex + 137\,d^4}{e^{11}x^5 + 5\,de^{10}x^4 + 10\,d^2e^9x^3 + 10\,d^3e^8x^2 + 5\,d^4e^7x + d^5e^6} + \frac{60\log(ex+d)}{de^6} - \frac{60\log(x)}{de^6}\right) - \frac{(6\,e^5x^5 + 15\,de^4x^4 + 20\,d^2e^3x^3 + 15\,d^3e^2x^2 + 6\,d^4ex + d^5)b\log(cx^n)}{6\,(e^{12}x^6 + 6\,de^{11}x^5 + 15\,d^2e^{10}x^4 + 20\,d^3e^9x^3 + 15\,d^4e^8x^2 + 6\,d^5e^7x + d^6e^6)} - \frac{(6\,e^5x^5 + 15\,de^4x^4 + 20\,d^2e^3x^3 + 15\,d^3e^2x^2 + 6\,d^4ex + d^5)a}{6\,(e^{12}x^6 + 6\,de^{11}x^5 + 15\,d^2e^{10}x^4 + 20\,d^3e^9x^3 + 15\,d^4e^8x^2 + 6\,d^5e^7x + d^6e^6)}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
-1/360*b*n*((300*e^4*x^4 + 900*d*e^3*x^3 + 1100*d^2*e^2*x^2 + 625*d^3*e*x
+ 137*d^4)/(e^11*x^5 + 5*d*e^10*x^4 + 10*d^2*e^9*x^3 + 10*d^3*e^8*x^2 + 5*
d^4*e^7*x + d^5*e^6) + 60*log(e*x + d)/(d*e^6) - 60*log(x)/(d*e^6)) - 1/6*
(6*e^5*x^5 + 15*d*e^4*x^4 + 20*d^2*e^3*x^3 + 15*d^3*e^2*x^2 + 6*d^4*e*x +
d^5)*b*log(c*x^n)/(e^12*x^6 + 6*d*e^11*x^5 + 15*d^2*e^10*x^4 + 20*d^3*e^9*
x^3 + 15*d^4*e^8*x^2 + 6*d^5*e^7*x + d^6*e^6) - 1/6*(6*e^5*x^5 + 15*d*e^4*
x^4 + 20*d^2*e^3*x^3 + 15*d^3*e^2*x^2 + 6*d^4*e*x + d^5)*a/(e^12*x^6 + 6*d
*e^11*x^5 + 15*d^2*e^10*x^4 + 20*d^3*e^9*x^3 + 15*d^4*e^8*x^2 + 6*d^5*e^7*
x + d^6*e^6)
```

3.65.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 424 vs. $2(122) = 244$.

Time = 0.47 (sec) , antiderivative size = 424, normalized size of antiderivative = 3.12

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{(6\,be^5nx^5 + 15\,bde^4nx^4 + 20\,bd^2e^3nx^3 + 15\,bd^3e^2nx^2 + 6\,bd^4enx + bd^5n)\log(x)}{6\,(e^{12}x^6 + 6\,de^{11}x^5 + 15\,d^2e^{10}x^4 + 20\,d^3e^9x^3 + 15\,d^4e^8x^2 + 6\,d^5e^7x + d^6e^6)} - \frac{300\,be^5nx^5 + 360\,be^5x^5\log(c) + 1200\,bde^4nx^4 + 360\,ae^5x^5 + 900\,bde^4x^4\log(c) + 2000\,bd^2e^3nx^3 + 900\,a \cdots}{\cdots} - \frac{bn\log(ex+d)}{6\,de^6} + \frac{bn\log(x)}{6\,de^6}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
-1/6*(6*b*e^5*n*x^5 + 15*b*d*e^4*n*x^4 + 20*b*d^2*e^3*n*x^3 + 15*b*d^3*e^2
*n*x^2 + 6*b*d^4*e*n*x + b*d^5*n)*log(x)/(e^12*x^6 + 6*d*e^11*x^5 + 15*d^2
*e^10*x^4 + 20*d^3*e^9*x^3 + 15*d^4*e^8*x^2 + 6*d^5*e^7*x + d^6*e^6) - 1/3
60*(300*b*e^5*n*x^5 + 360*b*e^5*x^5*log(c) + 1200*b*d*e^4*n*x^4 + 360*a*e^
5*x^5 + 900*b*d*e^4*x^4*log(c) + 2000*b*d^2*e^3*n*x^3 + 900*a*d*e^4*x^4 +
1200*b*d^2*e^3*x^3*log(c) + 1725*b*d^3*e^2*n*x^2 + 1200*a*d^2*e^3*x^3 + 90
0*b*d^3*e^2*x^2*log(c) + 762*b*d^4*e*n*x + 900*a*d^3*e^2*x^2 + 360*b*d^4*e
*x*log(c) + 137*b*d^5*n + 360*a*d^4*e*x + 60*b*d^5*log(c) + 60*a*d^5)/(e^1
2*x^6 + 6*d*e^11*x^5 + 15*d^2*e^10*x^4 + 20*d^3*e^9*x^3 + 15*d^4*e^8*x^2 +
 6*d^5*e^7*x + d^6*e^6) - 1/6*b*n*log(e*x + d)/(d*e^6) + 1/6*b*n*log(x)/(d
*e^6)
```

3.65.9 Mupad [B] (verification not implemented)

Time = 1.27 (sec) , antiderivative size = 341, normalized size of antiderivative = 2.51

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex)^7}\,dx =$$
$$-\frac{x^5\left(6\,a\,e^5+5\,b\,e^5\,n\right)+x\left(6\,a\,d^4\,e+\frac{127\,b\,d^4\,e\,n}{10}\right)+a\,d^5+x^3\left(20\,a\,d^2\,e^3+\frac{100\,b\,d^2\,e^3\,n}{3}\right)+x^2\left(15\,a\,d^3\,e^2+11\right.}{6\,d^6\,e^6+36\,d^5\,e^7\,x+90\,d^4\,e^8\,x^2+120\,d^3\,e^9\,x^3+90\,d^2\,e^{10}\,x^4+36\,d\,e^{1}}$$
$$-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^5}{6\,e^6}+\frac{b\,x^5}{e}+\frac{10\,b\,d^2\,x^3}{3\,e^3}+\frac{5\,b\,d^3\,x^2}{2\,e^4}+\frac{5\,b\,d\,x^4}{2\,e^2}+\frac{b\,d^4\,x}{e^5}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6}$$
$$-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d\,e^6}$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
- (x^5*(6*a*e^5 + 5*b*e^5*n) + x*(6*a*d^4*e + (127*b*d^4*e*n)/10) + a*d^5
+ x^3*(20*a*d^2*e^3 + (100*b*d^2*e^3*n)/3) + x^2*(15*a*d^3*e^2 + (115*b*d^
3*e^2*n)/4) + x^4*(15*a*d*e^4 + 20*b*d*e^4*n) + (137*b*d^5*n)/60)/(6*d^6*e
^6 + 6*e^12*x^6 + 36*d^5*e^7*x + 36*d*e^11*x^5 + 90*d^4*e^8*x^2 + 120*d^3*
e^9*x^3 + 90*d^2*e^10*x^4) - (log(c*x^n)*((b*d^5)/(6*e^6) + (b*x^5)/e + (1
0*b*d^2*x^3)/(3*e^3) + (5*b*d^3*x^2)/(2*e^4) + (5*b*d*x^4)/(2*e^2) + (b*d^
4*x)/e^5))/(d^6 + e^6*x^6 + 6*d*e^5*x^5 + 15*d^4*e^2*x^2 + 20*d^3*e^3*x^3
+ 15*d^2*e^4*x^4 + 6*d^5*e*x) - (b*n*atanh((2*e*x)/d + 1))/(3*d*e^6)
```

3.66 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx$

3.66.1 Optimal result

Integrand size = 21, antiderivative size = 163

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{bnx^5}{30d^2(d+ex)^5}+\frac{bd^2n}{120e^5(d+ex)^4}-\frac{2bdn}{45e^5(d+ex)^3}+\frac{bn}{10e^5(d+ex)^2}-\frac{2bn}{15de^5(d+ex)}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}+\frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5}-\frac{bn\log(d+ex)}{30d^2e^5}$$

output
```
-1/30*b*n*x^5/d^2/(e*x+d)^5+1/120*b*d^2*n/e^5/(e*x+d)^4-2/45*b*d*n/e^5/(e*
x+d)^3+1/10*b*n/e^5/(e*x+d)^2-2/15*b*n/d/e^5/(e*x+d)+1/6*x^5*(a+b*ln(c*x^n
))/d/(e*x+d)^6+1/30*x^5*(a+b*ln(c*x^n))/d^2/(e*x+d)^5-1/30*b*n*ln(e*x+d)/d
^2/e^5
```

3.66.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 316, normalized size of antiderivative = 1.94

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{12ad^6+13bd^6n+72ad^5ex+66bd^5enx+180ad^4e^2x^2+129bd^4e^2nx^2+240ad^3e^3x^3+112bd^3e^3nx^3+1\ldots}{\ldots}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
-1/360*(12*a*d^6 + 13*b*d^6*n + 72*a*d^5*e*x + 66*b*d^5*e*n*x + 180*a*d^4*
e^2*x^2 + 129*b*d^4*e^2*n*x^2 + 240*a*d^3*e^3*x^3 + 112*b*d^3*e^3*n*x^3 +
180*a*d^2*e^4*x^4 + 24*b*d^2*e^4*n*x^4 - 12*b*d*e^5*n*x^5 - 12*b*n*(d + e*
x)^6*Log[x] + 12*b*d^2*(d^4 + 6*d^3*e*x + 15*d^2*e^2*x^2 + 20*d*e^3*x^3 +
15*e^4*x^4)*Log[c*x^n] + 12*b*d^6*n*Log[d + e*x] + 72*b*d^5*e*n*x*Log[d +
e*x] + 180*b*d^4*e^2*n*x^2*Log[d + e*x] + 240*b*d^3*e^3*n*x^3*Log[d + e*x]
 + 180*b*d^2*e^4*n*x^4*Log[d + e*x] + 72*b*d*e^5*n*x^5*Log[d + e*x] + 12*b
*e^6*n*x^6*Log[d + e*x])/(d^2*e^5*(d + e*x)^6)
```

3.66.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 148, normalized size of antiderivative = 0.91, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {2782, 27, 87, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}dx$$

$$\Big\downarrow \text{2782}$$

$$-bn\int \frac{x^4(6d+ex)}{30d^2(d+ex)^6}dx+\frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{x^4(6d+ex)}{(d+ex)^6}dx}{30d^2}+\frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}$$

$$\Big\downarrow \text{87}$$

$$-\frac{bn\left(\int \frac{x^4}{(d+ex)^5}dx+\frac{x^5}{(d+ex)^5}\right)}{30d^2}+\frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}$$

$$\Big\downarrow \text{49}$$

$$-\frac{bn\left(\int \left(\frac{d^4}{e^4(d+ex)^5}-\frac{4d^3}{e^4(d+ex)^4}+\frac{6d^2}{e^4(d+ex)^3}-\frac{4d}{e^4(d+ex)^2}+\frac{1}{e^4(d+ex)}\right)dx+\frac{x^5}{(d+ex)^5}\right)}{30d^2}+\frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}$$

$$\downarrow \text{2009}$$

$$\frac{x^5(a+b\log(cx^n))}{30d^2(d+ex)^5}+\frac{x^5(a+b\log(cx^n))}{6d(d+ex)^6}-\frac{bn\left(-\frac{d^4}{4e^5(d+ex)^4}+\frac{4d^3}{3e^5(d+ex)^3}-\frac{3d^2}{e^5(d+ex)^2}+\frac{4d}{e^5(d+ex)}+\frac{\log(d+ex)}{e^5}+\frac{x^5}{(d+ex)^5}\right)}{30d^2}$$

input
```
Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(x^5*(a + b*Log[c*x^n]))/(6*d*(d + e*x)^6) + (x^5*(a + b*Log[c*x^n]))/(30*
d^2*(d + e*x)^5) - (b*n*(x^5/(d + e*x)^5 - d^4/(4*e^5*(d + e*x)^4) + (4*d^
3)/(3*e^5*(d + e*x)^3) - (3*d^2)/(e^5*(d + e*x)^2) + (4*d)/(e^5*(d + e*x))
 + Log[d + e*x]/e^5))/(30*d^2)
```

3.66.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 87
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[(-(b*e - a*f))*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(f*(p
+ 1)*(c*f - d*e))), x] - Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p
+ 1)))/(f*(p + 1)*(c*f - d*e))   Int[(c + d*x)^n*(e + f*x)^(p + 1), x], x]
/; FreeQ[{a, b, c, d, e, f, n}, x] && LtQ[p, -1] && ( !LtQ[n, -1] || Intege
rQ[p] ||  !(IntegerQ[n] ||  !(EqQ[e, 0] ||  !(EqQ[c, 0] || LtQ[p, n]))))
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2782
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Simp[(a + b*Log[c*
x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[
{a, b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

3.66.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 434 vs. $2(147) = 294$.

Time = 1.35 (sec) , antiderivative size = 435, normalized size of antiderivative = 2.67

method	result
parallelrisch	$\frac{-72x\ln(c\,x^n)b\,d^5e^2-180x^2\ln(c\,x^n)b\,d^4e^3-240x^3\ln(c\,x^n)b\,d^3e^4-180x^4\ln(c\,x^n)b\,d^2e^5-78xb\,d^5e^2n-159x^2b\,d^4e^3n-152x^3b\,d}{}$
risch	Expression too large to display

input
```
int(x^4*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/360*(-72*x*ln(c*x^n)*b*d^5*e^2-180*x^2*ln(c*x^n)*b*d^4*e^3-240*x^3*ln(c*
x^n)*b*d^3*e^4-180*x^4*ln(c*x^n)*b*d^2*e^5-78*x*b*d^5*e^2*n-159*x^2*b*d^4*
e^3*n-152*x^3*b*d^3*e^4*n-54*x^4*b*d^2*e^5*n+12*ln(x)*x^6*b*e^7*n-12*ln(e*
x+d)*x^6*b*e^7*n+12*ln(x)*b*d^6*e*n-12*ln(e*x+d)*b*d^6*e*n-12*a*d^6*e-240*
ln(e*x+d)*x^3*b*d^3*e^4*n+180*ln(x)*x^2*b*d^4*e^3*n-180*ln(e*x+d)*x^2*b*d^
4*e^3*n+72*ln(x)*x*b*d^5*e^2*n-72*ln(e*x+d)*x*b*d^5*e^2*n+72*ln(x)*x^5*b*d
*e^6*n-72*ln(e*x+d)*x^5*b*d*e^6*n+180*ln(x)*x^4*b*d^2*e^5*n-180*ln(e*x+d)*
x^4*b*d^2*e^5*n+240*ln(x)*x^3*b*d^3*e^4*n-15*b*d^6*e*n-12*ln(c*x^n)*b*d^6*
e-2*x^6*b*e^7*n-72*x*a*d^5*e^2-180*x^2*a*d^4*e^3-240*x^3*a*d^3*e^4-180*x^4
*a*d^2*e^5)/d^2/e^6/(e*x+d)^6
```

3.66.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 356 vs. $2(147) = 294$.

Time = 0.31 (sec) , antiderivative size = 356, normalized size of antiderivative = 2.18

$$\int \frac{x^4(a + b\log(cx^n))}{(d+ex)^7}\,dx = \frac{12\,bde^5nx^5 - 13\,bd^6n - 12\,ad^6 - 12\,(2\,bd^2e^4n + 15\,ad^2e^4)x^4 - 16\,(7\,bd^3e^3n + 15\,ad^3e^3)x^3 - 3\,(43\,bd^4e^2n + \ldots}{}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
1/360*(12*b*d*e^5*n*x^5 - 13*b*d^6*n - 12*a*d^6 - 12*(2*b*d^2*e^4*n + 15*a
*d^2*e^4)*x^4 - 16*(7*b*d^3*e^3*n + 15*a*d^3*e^3)*x^3 - 3*(43*b*d^4*e^2*n
+ 60*a*d^4*e^2)*x^2 - 6*(11*b*d^5*e*n + 12*a*d^5*e)*x - 12*(b*e^6*n*x^6 +
6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4 + 20*b*d^3*e^3*n*x^3 + 15*b*d^4*e^2*n
*x^2 + 6*b*d^5*e*n*x + b*d^6*n)*log(e*x + d) - 12*(15*b*d^2*e^4*x^4 + 20*b
*d^3*e^3*x^3 + 15*b*d^4*e^2*x^2 + 6*b*d^5*e*x + b*d^6)*log(c) + 12*(b*e^6*
n*x^6 + 6*b*d*e^5*n*x^5)*log(x))/(d^2*e^11*x^6 + 6*d^3*e^10*x^5 + 15*d^4*e
^9*x^4 + 20*d^5*e^8*x^3 + 15*d^6*e^7*x^2 + 6*d^7*e^6*x + d^8*e^5)
```

3.66.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1972 vs. $2(155) = 310$.

Time = 75.51 (sec) , antiderivative size = 1972, normalized size of antiderivative = 12.10

$$\int \frac{x^4(a + b\log(cx^n))}{(d + ex)^7} \, dx = \text{Too large to display}$$

input
```
integrate(x**4*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d
, 0) & Eq(e, 0)), ((a*x**5/5 - b*n*x**5/25 + b*x**5*log(c*x**n)/5)/d**7, E
q(e, 0)), ((-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**7, Eq(
d, 0)), (-12*a*d**6/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**
2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360
*d**2*e**11*x**6) - 72*a*d**5*e*x/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400
*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e*
*10*x**5 + 360*d**2*e**11*x**6) - 180*a*d**4*e**2*x**2/(360*d**8*e**5 + 21
60*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**
9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6) - 240*a*d**3*e**3*x**
3/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8
*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6)
- 180*a*d**2*e**4*x**4/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*
x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4 + 2160*d**3*e**10*x**5 +
360*d**2*e**11*x**6) - 12*b*d**6*n*log(d/e + x)/(360*d**8*e**5 + 2160*d**7
*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**4*e**9*x**4
+ 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6) - 13*b*d**6*n/(360*d**8*e**5
 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 + 7200*d**5*e**8*x**3 + 5400*d**
4*e**9*x**4 + 2160*d**3*e**10*x**5 + 360*d**2*e**11*x**6) - 72*b*d**5*e*n*
x*log(d/e + x)/(360*d**8*e**5 + 2160*d**7*e**6*x + 5400*d**6*e**7*x**2 ...
```

3.66.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 358 vs. $2(147) = 294$.

Time = 0.21 (sec) , antiderivative size = 358, normalized size of antiderivative = 2.20

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{1}{360}\,bn\left(\frac{12\,e^4x^4 - 36\,de^3x^3 - 76\,d^2e^2x^2 - 53\,d^3ex - 13\,d^4}{de^{10}x^5 + 5\,d^2e^9x^4 + 10\,d^3e^8x^3 + 10\,d^4e^7x^2 + 5\,d^5e^6x + d^6e^5} - \frac{12\,\log(ex+d)}{d^2e^5} + \frac{12\,\log(x)}{d^2e^5}\right)$$
$$- \frac{(15\,e^4x^4 + 20\,de^3x^3 + 15\,d^2e^2x^2 + 6\,d^3ex + d^4)b\log(cx^n)}{30\,(e^{11}x^6 + 6\,de^{10}x^5 + 15\,d^2e^9x^4 + 20\,d^3e^8x^3 + 15\,d^4e^7x^2 + 6\,d^5e^6x + d^6e^5)}$$
$$- \frac{(15\,e^4x^4 + 20\,de^3x^3 + 15\,d^2e^2x^2 + 6\,d^3ex + d^4)a}{30\,(e^{11}x^6 + 6\,de^{10}x^5 + 15\,d^2e^9x^4 + 20\,d^3e^8x^3 + 15\,d^4e^7x^2 + 6\,d^5e^6x + d^6e^5)}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/360*b*n*((12*e^4*x^4 - 36*d*e^3*x^3 - 76*d^2*e^2*x^2 - 53*d^3*e*x - 13*d
^4)/(d*e^10*x^5 + 5*d^2*e^9*x^4 + 10*d^3*e^8*x^3 + 10*d^4*e^7*x^2 + 5*d^5*
e^6*x + d^6*e^5) - 12*log(e*x + d)/(d^2*e^5) + 12*log(x)/(d^2*e^5)) - 1/30
*(15*e^4*x^4 + 20*d*e^3*x^3 + 15*d^2*e^2*x^2 + 6*d^3*e*x + d^4)*b*log(c*x^
n)/(e^11*x^6 + 6*d*e^10*x^5 + 15*d^2*e^9*x^4 + 20*d^3*e^8*x^3 + 15*d^4*e^7
*x^2 + 6*d^5*e^6*x + d^6*e^5) - 1/30*(15*e^4*x^4 + 20*d*e^3*x^3 + 15*d^2*e
^2*x^2 + 6*d^3*e*x + d^4)*a/(e^11*x^6 + 6*d*e^10*x^5 + 15*d^2*e^9*x^4 + 20
*d^3*e^8*x^3 + 15*d^4*e^7*x^2 + 6*d^5*e^6*x + d^6*e^5)
```

3.66.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 394 vs. $2(147) = 294$.

Time = 0.38 (sec) , antiderivative size = 394, normalized size of antiderivative = 2.42

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= -\frac{(15\,be^4nx^4 + 20\,bde^3nx^3 + 15\,bd^2e^2nx^2 + 6\,bd^3enx + bd^4n)\log(x)}{30\,(e^{11}x^6 + 6\,de^{10}x^5 + 15\,d^2e^9x^4 + 20\,d^3e^8x^3 + 15\,d^4e^7x^2 + 6\,d^5e^6x + d^6e^5)}$$
$$+ \frac{12\,be^5nx^5 - 24\,bde^4nx^4 - 180\,bde^4x^4\log(c) - 112\,bd^2e^3nx^3 - 180\,ade^4x^4 - 240\,bd^2e^3x^3\log(c) - 129\,bd}{360\,(de^{11}x^6 + 6\,d^2e^{10}x^5}$$
$$- \frac{bn\log(ex+d)}{30\,d^2e^5} + \frac{bn\log(x)}{30\,d^2e^5}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
-1/30*(15*b*e^4*n*x^4 + 20*b*d*e^3*n*x^3 + 15*b*d^2*e^2*n*x^2 + 6*b*d^3*e*
n*x + b*d^4*n)*log(x)/(e^11*x^6 + 6*d*e^10*x^5 + 15*d^2*e^9*x^4 + 20*d^3*e
^8*x^3 + 15*d^4*e^7*x^2 + 6*d^5*e^6*x + d^6*e^5) + 1/360*(12*b*e^5*n*x^5 -
 24*b*d*e^4*n*x^4 - 180*b*d*e^4*x^4*log(c) - 112*b*d^2*e^3*n*x^3 - 180*a*d
*e^4*x^4 - 240*b*d^2*e^3*x^3*log(c) - 129*b*d^3*e^2*n*x^2 - 240*a*d^2*e^3*
x^3 - 180*b*d^3*e^2*x^2*log(c) - 66*b*d^4*e*n*x - 180*a*d^3*e^2*x^2 - 72*b
*d^4*e*x*log(c) - 13*b*d^5*n - 72*a*d^4*e*x - 12*b*d^5*log(c) - 12*a*d^5)/
(d*e^11*x^6 + 6*d^2*e^10*x^5 + 15*d^3*e^9*x^4 + 20*d^4*e^8*x^3 + 15*d^5*e^
7*x^2 + 6*d^6*e^6*x + d^7*e^5) - 1/30*b*n*log(e*x + d)/(d^2*e^5) + 1/30*b*
n*log(x)/(d^2*e^5)
```

3.66.9 Mupad [B] (verification not implemented)

Time = 1.18 (sec) , antiderivative size = 320, normalized size of antiderivative = 1.96

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex)^7}\,dx =$$

$$-\frac{x^4\left(15\,a\,e^4+2\,b\,e^4\,n\right)+x\left(6\,a\,d^3\,e+\frac{11\,b\,d^3\,e\,n}{2}\right)+a\,d^4+x^2\left(15\,a\,d^2\,e^2+\frac{43\,b\,d^2\,e^2\,n}{4}\right)+x^3\left(20\,a\,d\,e^3+\frac{28\,b}{}\right.}{30\,d^6\,e^5+180\,d^5\,e^6\,x+450\,d^4\,e^7\,x^2+600\,d^3\,e^8\,x^3+450\,d^2\,e^9\,x^4+180\,d\,e^{10}\,x^5+30}$$

$$-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d^4}{30\,e^5}+\frac{b\,x^4}{2\,e}+\frac{b\,d^2\,x^2}{2\,e^3}+\frac{2\,b\,d\,x^3}{3\,e^2}+\frac{b\,d^3\,x}{5\,e^4}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6}$$

$$-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{15\,d^2\,e^5}$$

input
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
- (x^4*(15*a*e^4 + 2*b*e^4*n) + x*(6*a*d^3*e + (11*b*d^3*e*n)/2) + a*d^4 +
 x^2*(15*a*d^2*e^2 + (43*b*d^2*e^2*n)/4) + x^3*(20*a*d*e^3 + (28*b*d*e^3*n
)/3) + (13*b*d^4*n)/12 - (b*e^5*n*x^5)/d)/(30*d^6*e^5 + 30*e^11*x^6 + 180*
d^5*e^6*x + 180*d*e^10*x^5 + 450*d^4*e^7*x^2 + 600*d^3*e^8*x^3 + 450*d^2*e
^9*x^4) - (log(c*x^n)*((b*d^4)/(30*e^5) + (b*x^4)/(2*e) + (b*d^2*x^2)/(2*e
^3) + (2*b*d*x^3)/(3*e^2) + (b*d^3*x)/(5*e^4)))/(d^6 + e^6*x^6 + 6*d*e^5*x
^5 + 15*d^4*e^2*x^2 + 20*d^3*e^3*x^3 + 15*d^2*e^4*x^4 + 6*d^5*e*x) - (b*n*
atanh((2*e*x)/d + 1))/(15*d^2*e^5)
```

3.67 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx$

3.67.1 Optimal result

Integrand size = 21, antiderivative size = 226

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx =& -\frac{bd^2n}{30e^4(d+ex)^5}+\frac{13bdn}{120e^4(d+ex)^4}-\frac{19bn}{180e^4(d+ex)^3}\\ &+\frac{bn}{120de^4(d+ex)^2}+\frac{bn}{60d^2e^4(d+ex)}+\frac{bn\log(x)}{60d^3e^4}\\ &+\frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6}-\frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5}\\ &+\frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4}-\frac{a+b\log(cx^n)}{3e^4(d+ex)^3}-\frac{bn\log(d+ex)}{60d^3e^4}\end{aligned}$$

output
```
-1/30*b*d^2*n/e^4/(e*x+d)^5+13/120*b*d*n/e^4/(e*x+d)^4-19/180*b*n/e^4/(e*x
+d)^3+1/120*b*n/d/e^4/(e*x+d)^2+1/60*b*n/d^2/e^4/(e*x+d)+1/60*b*n*ln(x)/d^
3/e^4+1/6*d^3*(a+b*ln(c*x^n))/e^4/(e*x+d)^6-3/5*d^2*(a+b*ln(c*x^n))/e^4/(e
*x+d)^5+3/4*d*(a+b*ln(c*x^n))/e^4/(e*x+d)^4+1/3*(-a-b*ln(c*x^n))/e^4/(e*x+
d)^3-1/60*b*n*ln(e*x+d)/d^3/e^4
```

3.67.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 281, normalized size of antiderivative = 1.24

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{ad^3}{6e^4(d+ex)^6} - \frac{3ad^2}{5e^4(d+ex)^5} - \frac{bd^2n}{30e^4(d+ex)^5} + \frac{3ad}{4e^4(d+ex)^4} + \frac{13bdn}{120e^4(d+ex)^4} - \frac{a}{3e^4(d+ex)^3} - \frac{19bn}{180e^4(d+ex)^3} + \frac{bn}{120de^4(d+ex)^2} + \frac{bn}{60d^2e^4(d+ex)} + \frac{bn\log(x)}{60d^3e^4} + \frac{bd^3\log(cx^n)}{6e^4(d+ex)^6} - \frac{3bd^2\log(cx^n)}{5e^4(d+ex)^5} + \frac{3bd\log(cx^n)}{4e^4(d+ex)^4} - \frac{b\log(cx^n)}{3e^4(d+ex)^3} - \frac{bn\log(d+ex)}{60d^3e^4}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(a*d^3)/(6*e^4*(d + e*x)^6) - (3*a*d^2)/(5*e^4*(d + e*x)^5) - (b*d^2*n)/(3
0*e^4*(d + e*x)^5) + (3*a*d)/(4*e^4*(d + e*x)^4) + (13*b*d*n)/(120*e^4*(d
+ e*x)^4) - a/(3*e^4*(d + e*x)^3) - (19*b*n)/(180*e^4*(d + e*x)^3) + (b*n)
/(120*d*e^4*(d + e*x)^2) + (b*n)/(60*d^2*e^4*(d + e*x)) + (b*n*Log[x])/(60
*d^3*e^4) + (b*d^3*Log[c*x^n])/(6*e^4*(d + e*x)^6) - (3*b*d^2*Log[c*x^n])/
(5*e^4*(d + e*x)^5) + (3*b*d*Log[c*x^n])/(4*e^4*(d + e*x)^4) - (b*Log[c*x^
n])/(3*e^4*(d + e*x)^3) - (b*n*Log[d + e*x])/(60*d^3*e^4)
```

3.67.3 Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 191, normalized size of antiderivative = 0.85, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2782, 27, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx$$

$$\Big\downarrow \text{2782}$$

$$-bn\int -\frac{d^3+6exd^2+15e^2x^2d+20e^3x^3}{60e^4x(d+ex)^6}dx + \frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6} - \frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5} + \frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4} - \frac{a+b\log(cx^n)}{3e^4(d+ex)^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{d^3+6exd^2+15e^2x^2d+20e^3x^3}{x(d+ex)^6}dx}{60e^4}+\frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6}-\frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5}+\frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4}-\frac{a+b\log(cx^n)}{3e^4(d+ex)^3}$$

$$\Big\downarrow \text{2123}$$

$$\frac{bn\int \left(\frac{10ed^2}{(d+ex)^6}-\frac{26ed}{(d+ex)^5}+\frac{19e}{(d+ex)^4}-\frac{e}{(d+ex)^3d}-\frac{e}{(d+ex)^2d^2}+\frac{1}{xd^3}-\frac{e}{(d+ex)d^3}\right)dx}{60e^4}+\frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6}-\frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5}+\frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4}-\frac{a+b\log(cx^n)}{3e^4(d+ex)^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^3(a+b\log(cx^n))}{6e^4(d+ex)^6}-\frac{3d^2(a+b\log(cx^n))}{5e^4(d+ex)^5}+\frac{3d(a+b\log(cx^n))}{4e^4(d+ex)^4}-\frac{a+b\log(cx^n)}{3e^4(d+ex)^3}+\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}-\frac{2d^2}{(d+ex)^5}+\frac{1}{d^2(d+ex)}+\frac{13d}{2(d+ex)^4}-\frac{19}{3(d+ex)^3}+\frac{1}{2d(d+ex)^2}\right)}{60e^4}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(d^3*(a + b*Log[c*x^n]))/(6*e^4*(d + e*x)^6) - (3*d^2*(a + b*Log[c*x^n]))/
(5*e^4*(d + e*x)^5) + (3*d*(a + b*Log[c*x^n]))/(4*e^4*(d + e*x)^4) - (a +
b*Log[c*x^n])/(3*e^4*(d + e*x)^3) + (b*n*((-2*d^2)/(d + e*x)^5 + (13*d)/(2
*(d + e*x)^4) - 19/(3*(d + e*x)^3) + 1/(2*d*(d + e*x)^2) + 1/(d^2*(d + e*x
)) + Log[x]/d^3 - Log[d + e*x]/d^3))/(60*e^4)
```

3.67.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

rule 2782
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Simp[(a + b*Log[c*
x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[
{a, b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

3.67.4 Maple [A] (verified)

Time = 1.34 (sec) , antiderivative size = 413, normalized size of antiderivative = 1.83

method	result
parallelrisch	$\frac{-450x^2\ln(c\,x^n)b\,d^4e^4-600x^3\ln(c\,x^n)b\,d^3e^5-36x^5bd\,e^7n-96xb\,d^5e^3n-150x^2b\,d^4e^4n-50x^3b\,d^3e^5n+30\ln(x)x^6b\,e^8n-30\ln(e}{}$
risch	$-\frac{b(20e^3x^3+15d\,e^2x^2+6d^2ex+d^3)\ln(x^n)}{60(ex+d)^6e^4}+\frac{-90\ln(ex+d)b\,d^2e^4n\,x^4-120\ln(c)b\,d^3e^3x^3-90\ln(c)b\,d^4e^2x^2-36\ln(c)b\,d^5ex+}{}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/1800*(-450*x^2*ln(c*x^n)*b*d^4*e^4-600*x^3*ln(c*x^n)*b*d^3*e^5-36*x^5*b*
d*e^7*n-96*x*b*d^5*e^3*n-150*x^2*b*d^4*e^4*n-50*x^3*b*d^3*e^5*n+30*ln(x)*x
^6*b*e^8*n-30*ln(e*x+d)*x^6*b*e^8*n+30*ln(x)*b*d^6*e^2*n-30*ln(e*x+d)*b*d^
6*e^2*n-180*x*ln(c*x^n)*b*d^5*e^3-30*a*d^6*e^2+180*ln(x)*x^5*b*d*e^7*n-180
*ln(e*x+d)*x^5*b*d*e^7*n+450*ln(x)*x^4*b*d^2*e^6*n-450*ln(e*x+d)*x^4*b*d^2
*e^6*n+600*ln(x)*x^3*b*d^3*e^5*n-600*ln(e*x+d)*x^3*b*d^3*e^5*n+450*ln(x)*x
^2*b*d^4*e^4*n-450*ln(e*x+d)*x^2*b*d^4*e^4*n+180*ln(x)*x*b*d^5*e^3*n-180*l
n(e*x+d)*x*b*d^5*e^3*n-21*b*d^6*e^2*n-30*ln(c*x^n)*b*d^6*e^2-11*x^6*b*e^8*
n-180*x*a*d^5*e^3-450*x^2*a*d^4*e^4-600*x^3*a*d^3*e^5)/d^3/e^6/(e*x+d)^6
```

3.67.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 343, normalized size of antiderivative = 1.52

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{6\,bde^5nx^5+33\,bd^2e^4nx^4-2\,bd^6n-6\,ad^6+2\,(17\,bd^3e^3n-60\,ad^3e^3)x^3+3\,(bd^4e^2n-30\,ad^4e^2)x^2-6\,(bd^5}{}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
1/360*(6*b*d*e^5*n*x^5 + 33*b*d^2*e^4*n*x^4 - 2*b*d^6*n - 6*a*d^6 + 2*(17*
b*d^3*e^3*n - 60*a*d^3*e^3)*x^3 + 3*(b*d^4*e^2*n - 30*a*d^4*e^2)*x^2 - 6*(
b*d^5*e*n + 6*a*d^5*e)*x - 6*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4
*n*x^4 + 20*b*d^3*e^3*n*x^3 + 15*b*d^4*e^2*n*x^2 + 6*b*d^5*e*n*x + b*d^6*n
)*log(e*x + d) - 6*(20*b*d^3*e^3*x^3 + 15*b*d^4*e^2*x^2 + 6*b*d^5*e*x + b*
d^6)*log(c) + 6*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4)*log(x
))/(d^3*e^10*x^6 + 6*d^4*e^9*x^5 + 15*d^5*e^8*x^4 + 20*d^6*e^7*x^3 + 15*d^
7*e^6*x^2 + 6*d^8*e^5*x + d^9*e^4)
```

3.67.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1979 vs. $2(224) = 448$.

Time = 75.70 (sec) , antiderivative size = 1979, normalized size of antiderivative = 8.76

$$\int \frac{x^3(a + b\log(cx^n))}{(d + ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
Piecewise((zoo*(-a/(3*x**3) - b*n/(9*x**3) - b*log(c*x**n)/(3*x**3)), Eq(d
, 0) & Eq(e, 0)), ((a*x**4/4 - b*n*x**4/16 + b*x**4*log(c*x**n)/4)/d**7, E
q(e, 0)), ((-a/(3*x**3) - b*n/(9*x**3) - b*log(c*x**n)/(3*x**3))/e**7, Eq(
d, 0)), (-6*a*d**6/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2
 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d
**3*e**10*x**6) - 36*a*d**5*e*x/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d
**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9
*x**5 + 360*d**3*e**10*x**6) - 90*a*d**4*e**2*x**2/(360*d**9*e**4 + 2160*d
**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x*
*4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6) - 120*a*d**3*e**3*x**3/(36
0*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3
 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6) - 6*b*
d**6*n*log(d/e + x)/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**
2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x**5 + 360*
d**3*e**10*x**6) - 2*b*d**6*n/(360*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**
7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*e**8*x**4 + 2160*d**4*e**9*x
**5 + 360*d**3*e**10*x**6) - 36*b*d**5*e*n*x*log(d/e + x)/(360*d**9*e**4 +
 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*x**3 + 5400*d**5*
e**8*x**4 + 2160*d**4*e**9*x**5 + 360*d**3*e**10*x**6) - 6*b*d**5*e*n*x/(3
60*d**9*e**4 + 2160*d**8*e**5*x + 5400*d**7*e**6*x**2 + 7200*d**6*e**7*...
```

3.67.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 338, normalized size of antiderivative = 1.50

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{1}{360}\,bn\left(\frac{6\,e^4x^4+27\,de^3x^3+7\,d^2e^2x^2-4\,d^3ex-2\,d^4}{d^2e^9x^5+5\,d^3e^8x^4+10\,d^4e^7x^3+10\,d^5e^6x^2+5\,d^6e^5x+d^7e^4}-\frac{6\,\log(ex+d)}{d^3e^4}+\frac{6\,\log(x)}{d^3e^4}\right)$$
$$-\frac{(20\,e^3x^3+15\,de^2x^2+6\,d^2ex+d^3)b\log(cx^n)}{60\,(e^{10}x^6+6\,de^9x^5+15\,d^2e^8x^4+20\,d^3e^7x^3+15\,d^4e^6x^2+6\,d^5e^5x+d^6e^4)}$$
$$-\frac{(20\,e^3x^3+15\,de^2x^2+6\,d^2ex+d^3)a}{60\,(e^{10}x^6+6\,de^9x^5+15\,d^2e^8x^4+20\,d^3e^7x^3+15\,d^4e^6x^2+6\,d^5e^5x+d^6e^4)}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/360*b*n*((6*e^4*x^4 + 27*d*e^3*x^3 + 7*d^2*e^2*x^2 - 4*d^3*e*x - 2*d^4)/
(d^2*e^9*x^5 + 5*d^3*e^8*x^4 + 10*d^4*e^7*x^3 + 10*d^5*e^6*x^2 + 5*d^6*e^5
*x + d^7*e^4) - 6*log(e*x + d)/(d^3*e^4) + 6*log(x)/(d^3*e^4)) - 1/60*(20*
e^3*x^3 + 15*d*e^2*x^2 + 6*d^2*e*x + d^3)*b*log(c*x^n)/(e^10*x^6 + 6*d*e^9
*x^5 + 15*d^2*e^8*x^4 + 20*d^3*e^7*x^3 + 15*d^4*e^6*x^2 + 6*d^5*e^5*x + d^
6*e^4) - 1/60*(20*e^3*x^3 + 15*d*e^2*x^2 + 6*d^2*e*x + d^3)*a/(e^10*x^6 +
6*d*e^9*x^5 + 15*d^2*e^8*x^4 + 20*d^3*e^7*x^3 + 15*d^4*e^6*x^2 + 6*d^5*e^5
*x + d^6*e^4)
```

3.67.8 Giac [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 361, normalized size of antiderivative = 1.60

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= -\frac{(20\,be^3nx^3+15\,bde^2nx^2+6\,bd^2enx+bd^3n)\log(x)}{60\,(e^{10}x^6+6\,de^9x^5+15\,d^2e^8x^4+20\,d^3e^7x^3+15\,d^4e^6x^2+6\,d^5e^5x+d^6e^4)}$$
$$+\frac{6\,be^5nx^5+33\,bde^4nx^4+34\,bd^2e^3nx^3-120\,bd^2e^3x^3\log(c)+3\,bd^3e^2nx^2-120\,ad^2e^3x^3-90\,bd^3e^2x^2\log}{360\,(d^2e^{10}x^6+6\,d^3e^9x^5+15\,d^4e^8x^4+20\,d^5e^7}$$
$$-\frac{bn\log(ex+d)}{60\,d^3e^4}+\frac{bn\log(x)}{60\,d^3e^4}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
-1/60*(20*b*e^3*n*x^3 + 15*b*d*e^2*n*x^2 + 6*b*d^2*e*n*x + b*d^3*n)*log(x)
/(e^10*x^6 + 6*d*e^9*x^5 + 15*d^2*e^8*x^4 + 20*d^3*e^7*x^3 + 15*d^4*e^6*x^
2 + 6*d^5*e^5*x + d^6*e^4) + 1/360*(6*b*e^5*n*x^5 + 33*b*d*e^4*n*x^4 + 34*
b*d^2*e^3*n*x^3 - 120*b*d^2*e^3*x^3*log(c) + 3*b*d^3*e^2*n*x^2 - 120*a*d^2
*e^3*x^3 - 90*b*d^3*e^2*x^2*log(c) - 6*b*d^4*e*n*x - 90*a*d^3*e^2*x^2 - 36
*b*d^4*e*x*log(c) - 2*b*d^5*n - 36*a*d^4*e*x - 6*b*d^5*log(c) - 6*a*d^5)/(
d^2*e^10*x^6 + 6*d^3*e^9*x^5 + 15*d^4*e^8*x^4 + 20*d^5*e^7*x^3 + 15*d^6*e^
6*x^2 + 6*d^7*e^5*x + d^8*e^4) - 1/60*b*n*log(e*x + d)/(d^3*e^4) + 1/60*b*
n*log(x)/(d^3*e^4)
```

3.67.9 Mupad [B] (verification not implemented)

Time = 1.01 (sec) , antiderivative size = 296, normalized size of antiderivative = 1.31

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{x^3\left(20\,a\,e^3-\frac{17\,b\,e^3\,n}{3}\right)+x\,(6\,a\,d^2\,e+b\,d^2\,e\,n)+a\,d^3+x^2\left(15\,a\,d\,e^2-\frac{b\,d\,e^2\,n}{2}\right)+\frac{b\,d^3\,n}{3}-\frac{11\,b\,e^4\,n\,x^4}{2\,d}-\frac{b\,e^5\,n}{d^2}}{60\,d^6\,e^4+360\,d^5\,e^5\,x+900\,d^4\,e^6\,x^2+1200\,d^3\,e^7\,x^3+900\,d^2\,e^8\,x^4+360\,d\,e^9\,x^5+60\,e^{10}\,x^6} - \frac{\ln(c\,x^n)\left(\frac{b\,d^3}{60\,e^4}+\frac{b\,x^3}{3\,e}+\frac{b\,d\,x^2}{4\,e^2}+\frac{b\,d^2\,x}{10\,e^3}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6} - \frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{30\,d^3\,e^4}$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
- (x^3*(20*a*e^3 - (17*b*e^3*n)/3) + x*(6*a*d^2*e + b*d^2*e*n) + a*d^3 + x
^2*(15*a*d*e^2 - (b*d*e^2*n)/2) + (b*d^3*n)/3 - (11*b*e^4*n*x^4)/(2*d) - (
b*e^5*n*x^5)/d^2)/(60*d^6*e^4 + 60*e^10*x^6 + 360*d^5*e^5*x + 360*d*e^9*x^
5 + 900*d^4*e^6*x^2 + 1200*d^3*e^7*x^3 + 900*d^2*e^8*x^4) - (log(c*x^n)*((
b*d^3)/(60*e^4) + (b*x^3)/(3*e) + (b*d*x^2)/(4*e^2) + (b*d^2*x)/(10*e^3)))
/(d^6 + e^6*x^6 + 6*d*e^5*x^5 + 15*d^4*e^2*x^2 + 20*d^3*e^3*x^3 + 15*d^2*e
^4*x^4 + 6*d^5*e*x) - (b*n*atanh((2*e*x)/d + 1))/(30*d^3*e^4)
```

3.68 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$

3.68.1 Optimal result

Integrand size = 21, antiderivative size = 199

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx &= \frac{bdn}{30e^3(d+ex)^5} - \frac{7bn}{120e^3(d+ex)^4} + \frac{bn}{180de^3(d+ex)^3}\\ &\quad + \frac{bn}{120d^2e^3(d+ex)^2} + \frac{bn}{60d^3e^3(d+ex)} + \frac{bn\log(x)}{60d^4e^3}\\ &\quad - \frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6} + \frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5}\\ &\quad - \frac{a+b\log(cx^n)}{4e^3(d+ex)^4} - \frac{bn\log(d+ex)}{60d^4e^3}\end{aligned}$$

output
```
1/30*b*d*n/e^3/(e*x+d)^5-7/120*b*n/e^3/(e*x+d)^4+1/180*b*n/d/e^3/(e*x+d)^3
+1/120*b*n/d^2/e^3/(e*x+d)^2+1/60*b*n/d^3/e^3/(e*x+d)+1/60*b*n*ln(x)/d^4/e
^3-1/6*d^2*(a+b*ln(c*x^n))/e^3/(e*x+d)^6+2/5*d*(a+b*ln(c*x^n))/e^3/(e*x+d)
^5+1/4*(-a-b*ln(c*x^n))/e^3/(e*x+d)^4-1/60*b*n*ln(e*x+d)/d^4/e^3
```

3.68.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 192, normalized size of antiderivative = 0.96

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{-60ad^6+144ad^5(d+ex)+12bd^5n(d+ex)-90ad^4(d+ex)^2-21bd^4n(d+ex)^2+2bd^3n(d+ex)^3+3b}{}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(-60*a*d^6 + 144*a*d^5*(d + e*x) + 12*b*d^5*n*(d + e*x) - 90*a*d^4*(d + e*
x)^2 - 21*b*d^4*n*(d + e*x)^2 + 2*b*d^3*n*(d + e*x)^3 + 3*b*d^2*n*(d + e*x
)^4 + 6*b*d*n*(d + e*x)^5 + 6*b*n*(d + e*x)^6*Log[x] - 60*b*d^6*Log[c*x^n]
 + 144*b*d^5*(d + e*x)*Log[c*x^n] - 90*b*d^4*(d + e*x)^2*Log[c*x^n] - 6*b*
n*(d + e*x)^6*Log[d + e*x])/(360*d^4*e^3*(d + e*x)^6)
```

3.68.3 Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 164, normalized size of antiderivative = 0.82, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2782, 27, 1195, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$\Big\downarrow \text{ 2782}$$
$$-bn\int -\frac{d^2+6exd+15e^2x^2}{60e^3x(d+ex)^6}dx-\frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6}+\frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5}-\frac{a+b\log(cx^n)}{4e^3(d+ex)^4}$$
$$\Big\downarrow \text{ 27}$$
$$\frac{bn\int \frac{d^2+6exd+15e^2x^2}{x(d+ex)^6}dx}{60e^3}-\frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6}+\frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5}-\frac{a+b\log(cx^n)}{4e^3(d+ex)^4}$$
$$\Big\downarrow \text{ 1195}$$

$$\frac{bn\int\left(-\frac{e}{d^4(d+ex)}-\frac{e}{d^3(d+ex)^2}-\frac{e}{d^2(d+ex)^3}-\frac{e}{d(d+ex)^4}+\frac{14e}{(d+ex)^5}-\frac{10de}{(d+ex)^6}+\frac{1}{d^4x}\right)dx}{60e^3}-\frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6}+\frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5}-\frac{a+b\log(cx^n)}{4e^3(d+ex)^4}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{6e^3(d+ex)^6}+\frac{2d(a+b\log(cx^n))}{5e^3(d+ex)^5}-\frac{a+b\log(cx^n)}{4e^3(d+ex)^4}+\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex)}+\frac{1}{2d^2(d+ex)^2}+\frac{2d}{(d+ex)^5}-\frac{7}{2(d+ex)^4}+\frac{1}{3d(d+ex)^3}\right)}{60e^3}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
-1/6*(d^2*(a + b*Log[c*x^n]))/(e^3*(d + e*x)^6) + (2*d*(a + b*Log[c*x^n]))
/(5*e^3*(d + e*x)^5) - (a + b*Log[c*x^n])/(4*e^3*(d + e*x)^4) + (b*n*((2*d
)/(d + e*x)^5 - 7/(2*(d + e*x)^4) + 1/(3*d*(d + e*x)^3) + 1/(2*d^2*(d + e*
x)^2) + 1/(d^3*(d + e*x)) + Log[x]/d^4 - Log[d + e*x]/d^4))/(60*e^3)
```

3.68.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1195
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((f_.) + (g_.)*(x_))^(n_.)*((a_.) + (b_.)*(x
_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(f +
 g*x)^n*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n}, x
] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2782
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Simp[(a + b*Log[c*
x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[
{a, b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

3.68.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 382 vs. $2(182) = 364$.

Time = 1.34 (sec) , antiderivative size = 383, normalized size of antiderivative = 1.92

method	result
parallelrisch	$\frac{360\ln(x)x^5bd\,e^8n-360\ln(ex+d)x^5bd\,e^8n+900\ln(x)x^4b\,d^2e^7n-900\ln(ex+d)x^4b\,d^2e^7n+1200\ln(x)x^3b\,d^3e^6n-1200\ln(ex+d)}{}$
risch	$-\frac{b(15e^2x^2+6dex+d^2)\ln(x^n)}{60(ex+d)^6e^3}+\frac{-90\ln(ex+d)b\,d^2e^4n\,x^4-90\ln(c)b\,d^4e^2x^2-36\ln(c)b\,d^5ex+18i\pi b\,d^5ex\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)}{}$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/3600*(360*ln(x)*x^5*b*d*e^8*n-360*ln(e*x+d)*x^5*b*d*e^8*n+900*ln(x)*x^4*
b*d^2*e^7*n-900*ln(e*x+d)*x^4*b*d^2*e^7*n+1200*ln(x)*x^3*b*d^3*e^6*n-1200*
ln(e*x+d)*x^3*b*d^3*e^6*n+900*ln(x)*x^2*b*d^4*e^5*n-900*ln(e*x+d)*x^2*b*d^
4*e^5*n+360*ln(x)*x*b*d^5*e^4*n-360*ln(e*x+d)*x*b*d^5*e^4*n-360*x*ln(c*x^n
)*b*d^5*e^4-900*x^2*ln(c*x^n)*b*d^4*e^5-162*x^5*b*d*e^8*n-42*x*b*d^5*e^4*n
+75*x^2*b*d^4*e^5*n-225*x^4*b*d^2*e^7*n+60*ln(x)*x^6*b*e^9*n-60*ln(e*x+d)*
x^6*b*e^9*n+60*ln(x)*b*d^6*e^3*n-60*ln(e*x+d)*b*d^6*e^3*n-60*a*d^6*e^3-17*
b*d^6*e^3*n-60*ln(c*x^n)*b*d^6*e^3-37*x^6*b*e^9*n-360*x*a*d^5*e^4-900*x^2*
a*d^4*e^5)/d^4/e^6/(e*x+d)^6
```

3.68.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 333, normalized size of antiderivative = 1.67

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{6\,bde^5nx^5+33\,bd^2e^4nx^4+74\,bd^3e^3nx^3+2\,bd^6n-6\,ad^6+9\,(7\,bd^4e^2n-10\,ad^4e^2)x^2+18\,(bd^5en-2\,ad^5e}{}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
1/360*(6*b*d*e^5*n*x^5 + 33*b*d^2*e^4*n*x^4 + 74*b*d^3*e^3*n*x^3 + 2*b*d^6
*n - 6*a*d^6 + 9*(7*b*d^4*e^2*n - 10*a*d^4*e^2)*x^2 + 18*(b*d^5*e*n - 2*a*
d^5*e)*x - 6*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4 + 20*b*d^
3*e^3*n*x^3 + 15*b*d^4*e^2*n*x^2 + 6*b*d^5*e*n*x + b*d^6*n)*log(e*x + d) -
 6*(15*b*d^4*e^2*x^2 + 6*b*d^5*e*x + b*d^6)*log(c) + 6*(b*e^6*n*x^6 + 6*b*
d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4 + 20*b*d^3*e^3*n*x^3)*log(x))/(d^4*e^9*x^
6 + 6*d^5*e^8*x^5 + 15*d^6*e^7*x^4 + 20*d^7*e^6*x^3 + 15*d^8*e^5*x^2 + 6*d
^9*e^4*x + d^10*e^3)
```

3.68.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1986 vs. $2(196) = 392$.

Time = 75.27 (sec) , antiderivative size = 1986, normalized size of antiderivative = 9.98

$$\int \frac{x^2(a + b\log(cx^n))}{(d + ex)^7} \, dx = \text{Too large to display}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
Piecewise((zoo*(-a/(4*x**4) - b*n/(16*x**4) - b*log(c*x**n)/(4*x**4)), Eq(
d, 0) & Eq(e, 0)), ((a*x**3/3 - b*n*x**3/9 + b*x**3*log(c*x**n)/3)/d**7, E
q(e, 0)), ((-a/(4*x**4) - b*n/(16*x**4) - b*log(c*x**n)/(4*x**4))/e**7, Eq
(d, 0)), (-6*a*d**6/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x*
*2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360
*d**4*e**9*x**6) - 36*a*d**5*e*x/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400
*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e*
*8*x**5 + 360*d**4*e**9*x**6) - 90*a*d**4*e**2*x**2/(360*d**10*e**3 + 2160
*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*
x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) - 6*b*d**6*n*log(d/e + x)
/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6
*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) +
2*b*d**6*n/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200
*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**
9*x**6) - 36*b*d**5*e*n*x*log(d/e + x)/(360*d**10*e**3 + 2160*d**9*e**4*x
+ 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**7*x**4 + 2160*d
**5*e**8*x**5 + 360*d**4*e**9*x**6) + 18*b*d**5*e*n*x/(360*d**10*e**3 + 21
60*d**9*e**4*x + 5400*d**8*e**5*x**2 + 7200*d**7*e**6*x**3 + 5400*d**6*e**
7*x**4 + 2160*d**5*e**8*x**5 + 360*d**4*e**9*x**6) - 90*b*d**4*e**2*n*x**2
*log(d/e + x)/(360*d**10*e**3 + 2160*d**9*e**4*x + 5400*d**8*e**5*x**2 ...
```

3.68.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 316, normalized size of antiderivative = 1.59

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{1}{360}bn\left(\frac{6e^4x^4+27de^3x^3+47d^2e^2x^2+16d^3ex+2d^4}{d^3e^8x^5+5d^4e^7x^4+10d^5e^6x^3+10d^6e^5x^2+5d^7e^4x+d^8e^3}-\frac{6\log(ex+d)}{d^4e^3}+\frac{6\log(x)}{d^4e^3}\right)$$
$$-\frac{(15e^2x^2+6dex+d^2)b\log(cx^n)}{60(e^9x^6+6de^8x^5+15d^2e^7x^4+20d^3e^6x^3+15d^4e^5x^2+6d^5e^4x+d^6e^3)}$$
$$-\frac{(15e^2x^2+6dex+d^2)a}{60(e^9x^6+6de^8x^5+15d^2e^7x^4+20d^3e^6x^3+15d^4e^5x^2+6d^5e^4x+d^6e^3)}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/360*b*n*((6*e^4*x^4 + 27*d*e^3*x^3 + 47*d^2*e^2*x^2 + 16*d^3*e*x + 2*d^4
)/(d^3*e^8*x^5 + 5*d^4*e^7*x^4 + 10*d^5*e^6*x^3 + 10*d^6*e^5*x^2 + 5*d^7*e
^4*x + d^8*e^3) - 6*log(e*x + d)/(d^4*e^3) + 6*log(x)/(d^4*e^3)) - 1/60*(1
5*e^2*x^2 + 6*d*e*x + d^2)*b*log(c*x^n)/(e^9*x^6 + 6*d*e^8*x^5 + 15*d^2*e^
7*x^4 + 20*d^3*e^6*x^3 + 15*d^4*e^5*x^2 + 6*d^5*e^4*x + d^6*e^3) - 1/60*(1
5*e^2*x^2 + 6*d*e*x + d^2)*a/(e^9*x^6 + 6*d*e^8*x^5 + 15*d^2*e^7*x^4 + 20*
d^3*e^6*x^3 + 15*d^4*e^5*x^2 + 6*d^5*e^4*x + d^6*e^3)
```

3.68.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 322, normalized size of antiderivative = 1.62

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= -\frac{(15be^2nx^2+6bdenx+bd^2n)\log(x)}{60(e^9x^6+6de^8x^5+15d^2e^7x^4+20d^3e^6x^3+15d^4e^5x^2+6d^5e^4x+d^6e^3)}$$
$$+\frac{6be^5nx^5+33bde^4nx^4+74bd^2e^3nx^3+63bd^3e^2nx^2-90bd^3e^2x^2\log(c)+18bd^4enx-90ad^3e^2x^2-36}{360(d^3e^9x^6+6d^4e^8x^5+15d^5e^7x^4+20d^6e^6x^3+15d^7e^5x^2+}$$
$$-\frac{bn\log(ex+d)}{60d^4e^3}+\frac{bn\log(x)}{60d^4e^3}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
-1/60*(15*b*e^2*n*x^2 + 6*b*d*e*n*x + b*d^2*n)*log(x)/(e^9*x^6 + 6*d*e^8*x
^5 + 15*d^2*e^7*x^4 + 20*d^3*e^6*x^3 + 15*d^4*e^5*x^2 + 6*d^5*e^4*x + d^6*
e^3) + 1/360*(6*b*e^5*n*x^5 + 33*b*d*e^4*n*x^4 + 74*b*d^2*e^3*n*x^3 + 63*b
*d^3*e^2*n*x^2 - 90*b*d^3*e^2*x^2*log(c) + 18*b*d^4*e*n*x - 90*a*d^3*e^2*x
^2 - 36*b*d^4*e*x*log(c) + 2*b*d^5*n - 36*a*d^4*e*x - 6*b*d^5*log(c) - 6*a
*d^5)/(d^3*e^9*x^6 + 6*d^4*e^8*x^5 + 15*d^5*e^7*x^4 + 20*d^6*e^6*x^3 + 15*
d^7*e^5*x^2 + 6*d^8*e^4*x + d^9*e^3) - 1/60*b*n*log(e*x + d)/(d^4*e^3) + 1
/60*b*n*log(x)/(d^4*e^3)
```

3.68.9 Mupad [B] (verification not implemented)

Time = 0.91 (sec) , antiderivative size = 275, normalized size of antiderivative = 1.38

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{\frac{b\,d^2\,n}{3}-a\,d^2-x\,(6\,a\,d\,e-3\,b\,d\,e\,n)-x^2\left(15\,a\,e^2-\frac{21\,b\,e^2\,n}{2}\right)+\frac{37\,b\,e^3\,n\,x^3}{3\,d}+\frac{11\,b\,e^4\,n\,x^4}{2\,d^2}+\frac{b\,e^5\,n\,x^5}{d^3}}{60\,d^6\,e^3+360\,d^5\,e^4\,x+900\,d^4\,e^5\,x^2+1200\,d^3\,e^6\,x^3+900\,d^2\,e^7\,x^4+360\,d\,e^8\,x^5+60\,e^9\,x^6}$$
$$-\frac{\ln(c\,x^n)\,\left(\frac{b\,d^2}{60\,e^3}+\frac{b\,x^2}{4\,e}+\frac{b\,d\,x}{10\,e^2}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6}$$
$$-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{30\,d^4\,e^3}$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
((b*d^2*n)/3 - a*d^2 - x*(6*a*d*e - 3*b*d*e*n) - x^2*(15*a*e^2 - (21*b*e^2
*n)/2) + (37*b*e^3*n*x^3)/(3*d) + (11*b*e^4*n*x^4)/(2*d^2) + (b*e^5*n*x^5)
/d^3)/(60*d^6*e^3 + 60*e^9*x^6 + 360*d^5*e^4*x + 360*d*e^8*x^5 + 900*d^4*e
^5*x^2 + 1200*d^3*e^6*x^3 + 900*d^2*e^7*x^4) - (log(c*x^n)*((b*d^2)/(60*e^
3) + (b*x^2)/(4*e) + (b*d*x)/(10*e^2)))/(d^6 + e^6*x^6 + 6*d*e^5*x^5 + 15*
d^4*e^2*x^2 + 20*d^3*e^3*x^3 + 15*d^2*e^4*x^4 + 6*d^5*e*x) - (b*n*atanh((2
*e*x)/d + 1))/(30*d^4*e^3)
```

3.69 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx$

3.69.1 Optimal result

Integrand size = 19, antiderivative size = 174

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx = -\frac{bn}{30e^2(d+ex)^5}+\frac{bn}{120de^2(d+ex)^4}+\frac{bn}{90d^2e^2(d+ex)^3}+\frac{bn}{60d^3e^2(d+ex)^2}+\frac{bn}{30d^4e^2(d+ex)}+\frac{bn\log(x)}{30d^5e^2}+\frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6}-\frac{a+b\log(cx^n)}{5e^2(d+ex)^5}-\frac{bn\log(d+ex)}{30d^5e^2}$$

output
```
-1/30*b*n/e^2/(e*x+d)^5+1/120*b*n/d/e^2/(e*x+d)^4+1/90*b*n/d^2/e^2/(e*x+d)
^3+1/60*b*n/d^3/e^2/(e*x+d)^2+1/30*b*n/d^4/e^2/(e*x+d)+1/30*b*n*ln(x)/d^5/
e^2+1/6*d*(a+b*ln(c*x^n))/e^2/(e*x+d)^6+1/5*(-a-b*ln(c*x^n))/e^2/(e*x+d)^5
-1/30*b*n*ln(e*x+d)/d^5/e^2
```

3.69.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 160, normalized size of antiderivative = 0.92

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{60ad^6-72ad^5(d+ex)-12bd^5n(d+ex)+3bd^4n(d+ex)^2+4bd^3n(d+ex)^3+6bd^2n(d+ex)^4+12bdn(}{360d^5e^2(}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(60*a*d^6 - 72*a*d^5*(d + e*x) - 12*b*d^5*n*(d + e*x) + 3*b*d^4*n*(d + e*x
)^2 + 4*b*d^3*n*(d + e*x)^3 + 6*b*d^2*n*(d + e*x)^4 + 12*b*d*n*(d + e*x)^5
 + 12*b*n*(d + e*x)^6*Log[x] + 60*b*d^6*Log[c*x^n] - 72*b*d^5*(d + e*x)*Lo
g[c*x^n] - 12*b*n*(d + e*x)^6*Log[d + e*x])/(360*d^5*e^2*(d + e*x)^6)
```

3.69.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 139, normalized size of antiderivative = 0.80, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.211, Rules used = {2782, 27, 86, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}dx$$

$$\Big\downarrow \text{ 2782}$$

$$-bn\int -\frac{d+6ex}{30e^2x(d+ex)^6}dx-\frac{a+b\log(cx^n)}{5e^2(d+ex)^5}+\frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{bn\int \frac{d+6ex}{x(d+ex)^6}dx}{30e^2}-\frac{a+b\log(cx^n)}{5e^2(d+ex)^5}+\frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6}$$

$$\Big\downarrow \text{ 86}$$

$$\frac{bn\int \left(-\frac{e}{d^5(d+ex)}-\frac{e}{d^4(d+ex)^2}-\frac{e}{d^3(d+ex)^3}-\frac{e}{d^2(d+ex)^4}-\frac{e}{d(d+ex)^5}+\frac{5e}{(d+ex)^6}+\frac{1}{d^5x}\right)dx}{30e^2}-\frac{a+b\log(cx^n)}{5e^2(d+ex)^5}+\frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{a+b\log(cx^n)}{5e^2(d+ex)^5}+\frac{d(a+b\log(cx^n))}{6e^2(d+ex)^6}+\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\frac{\log(x)}{d^5}+\frac{1}{d^4(d+ex)}+\frac{1}{2d^3(d+ex)^2}+\frac{1}{3d^2(d+ex)^3}+\frac{1}{4d(d+ex)^4}-\frac{1}{(d+ex)^5}\right)}{30e^2}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^7,x]
```

output
```
(d*(a + b*Log[c*x^n]))/(6*e^2*(d + e*x)^6) - (a + b*Log[c*x^n])/(5*e^2*(d
+ e*x)^5) + (b*n*(-(d + e*x)^(-5) + 1/(4*d*(d + e*x)^4) + 1/(3*d^2*(d + e*
x)^3) + 1/(2*d^3*(d + e*x)^2) + 1/(d^4*(d + e*x)) + Log[x]/d^5 - Log[d + e
*x]/d^5))/(30*e^2)
```

3.69.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 86
```
Int[((a_.) + (b_.)*(x_))*((c_) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p_
.), x_] :> Int[ExpandIntegrand[(a + b*x)*(c + d*x)^n*(e + f*x)^p, x], x] /;
 FreeQ[{a, b, c, d, e, f, n}, x] && ((ILtQ[n, 0] && ILtQ[p, 0]) || EqQ[p, 1
] || (IGtQ[p, 0] && ( !IntegerQ[n] || LeQ[9*p + 5*(n + 2), 0] || GeQ[n + p
+ 1, 0] || (GeQ[n + p + 2, 0] && RationalQ[a, b, c, d, e, f]))))
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2782
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_))^(q
_), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x)^q, x]}, Simp[(a + b*Log[c*
x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[
{a, b, c, d, e, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[m, 0]
```

3.69.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 403 vs. 2(159) = 318.

Time = 1.27 (sec) , antiderivative size = 404, normalized size of antiderivative = 2.32

method	result
parallelrisch	$\frac{12\ln(x)x^6bd\,e^{10}n-12\ln(ex+d)x^6bd\,e^{10}n-66x^5b\,d^2e^9n-13x^6bd\,e^{10}n+12xb\,d^6e^5n-24x^2b\,d^5e^6n-112x^3b\,d^4e^7n-129x^4b\,d^3e^8}{}$
risch	$-\frac{b(6ex+d)\ln(x^n)}{30(ex+d)^6e^2}-\frac{180\ln(ex+d)b\,d^2e^4n\,x^4+72\ln(c)b\,d^5ex-36i\pi b\,d^5ex\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)-72\ln(-x)bd\,e^5n\,x}{}$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/360*(12*ln(x)*x^6*b*d*e^10*n-12*ln(e*x+d)*x^6*b*d*e^10*n-66*x^5*b*d^2*e^
9*n-13*x^6*b*d*e^10*n+12*x*b*d^6*e^5*n-24*x^2*b*d^5*e^6*n-112*x^3*b*d^4*e^
7*n-129*x^4*b*d^3*e^8*n+12*ln(x)*b*d^7*e^4*n-12*ln(e*x+d)*b*d^7*e^4*n+72*l
n(x)*x^5*b*d^2*e^9*n-72*ln(e*x+d)*x^5*b*d^2*e^9*n+180*ln(x)*x^4*b*d^3*e^8*
n-180*ln(e*x+d)*x^4*b*d^3*e^8*n+240*ln(x)*x^3*b*d^4*e^7*n-240*ln(e*x+d)*x^
3*b*d^4*e^7*n+180*ln(x)*x^2*b*d^5*e^6*n-180*ln(e*x+d)*x^2*b*d^5*e^6*n+72*l
n(x)*x*b*d^6*e^5*n-72*ln(e*x+d)*x*b*d^6*e^5*n-72*x*ln(c*x^n)*b*d^6*e^5-12*
ln(c*x^n)*b*d^7*e^4+72*x^5*a*d^2*e^9+12*x^6*a*d*e^10+180*x^2*a*d^5*e^6+240
*x^3*a*d^4*e^7+180*x^4*a*d^3*e^8)/e^6/d^6/(e*x+d)^6
```

3.69.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 323 vs. $2(156) = 312$.

Time = 0.31 (sec) , antiderivative size = 323, normalized size of antiderivative = 1.86

$$\int \frac{x(a + b\log(cx^n))}{(d + ex)^7} dx$$
$$= \frac{12\,bde^5nx^5 + 66\,bd^2e^4nx^4 + 148\,bd^3e^3nx^3 + 171\,bd^4e^2nx^2 + 13\,bd^6n - 12\,ad^6 + 18\,(5\,bd^5en - 4\,ad^5e)x - 1}{}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
1/360*(12*b*d*e^5*n*x^5 + 66*b*d^2*e^4*n*x^4 + 148*b*d^3*e^3*n*x^3 + 171*b
*d^4*e^2*n*x^2 + 13*b*d^6*n - 12*a*d^6 + 18*(5*b*d^5*e*n - 4*a*d^5*e)*x -
12*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4 + 20*b*d^3*e^3*n*x^
3 + 15*b*d^4*e^2*n*x^2 + 6*b*d^5*e*n*x + b*d^6*n)*log(e*x + d) - 12*(6*b*d
^5*e*x + b*d^6)*log(c) + 12*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*
n*x^4 + 20*b*d^3*e^3*n*x^3 + 15*b*d^4*e^2*n*x^2)*log(x))/(d^5*e^8*x^6 + 6*
d^6*e^7*x^5 + 15*d^7*e^6*x^4 + 20*d^8*e^5*x^3 + 15*d^9*e^4*x^2 + 6*d^10*e^
3*x + d^11*e^2)
```

3.69.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1992 vs. $2(168) = 336$.

Time = 75.49 (sec) , antiderivative size = 1992, normalized size of antiderivative = 11.45

$$\int \frac{x(a + b\log(cx^n))}{(d + ex)^7} dx = \text{Too large to display}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
Piecewise((zoo*(-a/(5*x**5) - b*n/(25*x**5) - b*log(c*x**n)/(5*x**5)), Eq(
d, 0) & Eq(e, 0)), ((a*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**7, E
q(e, 0)), ((-a/(5*x**5) - b*n/(25*x**5) - b*log(c*x**n)/(5*x**5))/e**7, Eq
(d, 0)), (-12*a*d**6/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*
x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 3
60*d**5*e**8*x**6) - 72*a*d**5*e*x/(360*d**11*e**2 + 2160*d**10*e**3*x + 5
400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6
*e**7*x**5 + 360*d**5*e**8*x**6) - 12*b*d**6*n*log(d/e + x)/(360*d**11*e**
2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d
**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x**6) + 13*b*d**6*n/(3
60*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x
**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x**6) - 72
*b*d**5*e*n*x*log(d/e + x)/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9
*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x*
*5 + 360*d**5*e**8*x**6) + 90*b*d**5*e*n*x/(360*d**11*e**2 + 2160*d**10*e*
*3*x + 5400*d**9*e**4*x**2 + 7200*d**8*e**5*x**3 + 5400*d**7*e**6*x**4 + 2
160*d**6*e**7*x**5 + 360*d**5*e**8*x**6) - 180*b*d**4*e**2*n*x**2*log(d/e
+ x)/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*d**9*e**4*x**2 + 7200*d**8
*e**5*x**3 + 5400*d**7*e**6*x**4 + 2160*d**6*e**7*x**5 + 360*d**5*e**8*x**
6) + 171*b*d**4*e**2*n*x**2/(360*d**11*e**2 + 2160*d**10*e**3*x + 5400*...
```

3.69.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 294, normalized size of antiderivative = 1.69

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= \frac{1}{360}\,bn\left(\frac{12\,e^4x^4+54\,de^3x^3+94\,d^2e^2x^2+77\,d^3ex+13\,d^4}{d^4e^7x^5+5\,d^5e^6x^4+10\,d^6e^5x^3+10\,d^7e^4x^2+5\,d^8e^3x+d^9e^2}-\frac{12\,\log(ex+d)}{d^5e^2}+\frac{12\,\log(x)}{d^5e^2}\right)$$
$$-\frac{(6\,ex+d)b\log(cx^n)}{30\,(e^8x^6+6\,de^7x^5+15\,d^2e^6x^4+20\,d^3e^5x^3+15\,d^4e^4x^2+6\,d^5e^3x+d^6e^2)}$$
$$-\frac{(6\,ex+d)a}{30\,(e^8x^6+6\,de^7x^5+15\,d^2e^6x^4+20\,d^3e^5x^3+15\,d^4e^4x^2+6\,d^5e^3x+d^6e^2)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/360*b*n*((12*e^4*x^4 + 54*d*e^3*x^3 + 94*d^2*e^2*x^2 + 77*d^3*e*x + 13*d
^4)/(d^4*e^7*x^5 + 5*d^5*e^6*x^4 + 10*d^6*e^5*x^3 + 10*d^7*e^4*x^2 + 5*d^8
*e^3*x + d^9*e^2) - 12*log(e*x + d)/(d^5*e^2) + 12*log(x)/(d^5*e^2)) - 1/3
0*(6*e*x + d)*b*log(c*x^n)/(e^8*x^6 + 6*d*e^7*x^5 + 15*d^2*e^6*x^4 + 20*d^
3*e^5*x^3 + 15*d^4*e^4*x^2 + 6*d^5*e^3*x + d^6*e^2) - 1/30*(6*e*x + d)*a/(
e^8*x^6 + 6*d*e^7*x^5 + 15*d^2*e^6*x^4 + 20*d^3*e^5*x^3 + 15*d^4*e^4*x^2 +
 6*d^5*e^3*x + d^6*e^2)
```

3.69.8 Giac [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 283, normalized size of antiderivative = 1.63

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx$$
$$= -\frac{(6\,benx+bdn)\log(x)}{30\,(e^8x^6+6\,de^7x^5+15\,d^2e^6x^4+20\,d^3e^5x^3+15\,d^4e^4x^2+6\,d^5e^3x+d^6e^2)}$$
$$+\frac{12\,be^5nx^5+66\,bde^4nx^4+148\,bd^2e^3nx^3+171\,bd^3e^2nx^2+90\,bd^4enx-72\,bd^4ex\log(c)+13\,bd^5n-72\,a}{360\,(d^4e^8x^6+6\,d^5e^7x^5+15\,d^6e^6x^4+20\,d^7e^5x^3+15\,d^8e^4x^2+6\,d^9e^3x+d^{10}e}$$
$$-\frac{bn\log(ex+d)}{30\,d^5e^2}+\frac{bn\log(x)}{30\,d^5e^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
-1/30*(6*b*e*n*x + b*d*n)*log(x)/(e^8*x^6 + 6*d*e^7*x^5 + 15*d^2*e^6*x^4 +
 20*d^3*e^5*x^3 + 15*d^4*e^4*x^2 + 6*d^5*e^3*x + d^6*e^2) + 1/360*(12*b*e^
5*n*x^5 + 66*b*d*e^4*n*x^4 + 148*b*d^2*e^3*n*x^3 + 171*b*d^3*e^2*n*x^2 + 9
0*b*d^4*e*n*x - 72*b*d^4*e*x*log(c) + 13*b*d^5*n - 72*a*d^4*e*x - 12*b*d^5
*log(c) - 12*a*d^5)/(d^4*e^8*x^6 + 6*d^5*e^7*x^5 + 15*d^6*e^6*x^4 + 20*d^7
*e^5*x^3 + 15*d^8*e^4*x^2 + 6*d^9*e^3*x + d^10*e^2) - 1/30*b*n*log(e*x + d
)/(d^5*e^2) + 1/30*b*n*log(x)/(d^5*e^2)
```

3.69.9 Mupad [B] (verification not implemented)

Time = 0.85 (sec) , antiderivative size = 251, normalized size of antiderivative = 1.44

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^7}\,dx = \frac{\frac{13\,b\,d\,n}{12}-x\left(6\,a\,e-\frac{15\,b\,e\,n}{2}\right)-a\,d+\frac{57\,b\,e^2\,n\,x^2}{4\,d}+\frac{37\,b\,e^3\,n\,x^3}{3\,d^2}+\frac{11\,b\,e^4\,n\,x^4}{2\,d^3}+\frac{b\,e^5\,n\,x^5}{d^4}}{30\,d^6\,e^2+180\,d^5\,e^3\,x+450\,d^4\,e^4\,x^2+600\,d^3\,e^5\,x^3+450\,d^2\,e^6\,x^4+180\,d\,e^7\,x^5+30\,e^8\,x^6} - \frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,d}{30\,e^2}+\frac{b\,x}{5\,e}\right)}{d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6} - \frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{15\,d^5\,e^2}$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^7,x)
```

output
```
((13*b*d*n)/12 - x*(6*a*e - (15*b*e*n)/2) - a*d + (57*b*e^2*n*x^2)/(4*d) +
 (37*b*e^3*n*x^3)/(3*d^2) + (11*b*e^4*n*x^4)/(2*d^3) + (b*e^5*n*x^5)/d^4)/
(30*d^6*e^2 + 30*e^8*x^6 + 180*d^5*e^3*x + 180*d*e^7*x^5 + 450*d^4*e^4*x^2
 + 600*d^3*e^5*x^3 + 450*d^2*e^6*x^4) - (log(c*x^n)*((b*d)/(30*e^2) + (b*x
)/(5*e)))/(d^6 + e^6*x^6 + 6*d*e^5*x^5 + 15*d^4*e^2*x^2 + 20*d^3*e^3*x^3 +
 15*d^2*e^4*x^4 + 6*d^5*e*x) - (b*n*atanh((2*e*x)/d + 1))/(15*d^5*e^2)
```

3.70 $\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx$

3.70.1 Optimal result

Integrand size = 18, antiderivative size = 152

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx = \frac{bn}{30de(d+ex)^5}+\frac{bn}{24d^2e(d+ex)^4}+\frac{bn}{18d^3e(d+ex)^3}+\frac{bn}{12d^4e(d+ex)^2}+\frac{bn}{6d^5e(d+ex)}+\frac{bn\log(x)}{6d^6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}-\frac{bn\log(d+ex)}{6d^6e}$$

output
```
1/30*b*n/d/e/(e*x+d)^5+1/24*b*n/d^2/e/(e*x+d)^4+1/18*b*n/d^3/e/(e*x+d)^3+1
/12*b*n/d^4/e/(e*x+d)^2+1/6*b*n/d^5/e/(e*x+d)+1/6*b*n*ln(x)/d^6/e+1/6*(-a-
b*ln(c*x^n))/e/(e*x+d)^6-1/6*b*n*ln(e*x+d)/d^6/e
```

3.70.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 99, normalized size of antiderivative = 0.65

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx = \frac{-\frac{a+b\log(cx^n)}{(d+ex)^6}+\frac{bn\left(\frac{d(137d^4+385d^3ex+470d^2e^2x^2+270de^3x^3+60e^4x^4)}{(d+ex)^5}+60\log(x)-60\log(d+ex)\right)}{60d^6}}{6e}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x)^7,x]
```

output
```
(-((a + b*Log[c*x^n])/(d + e*x)^6) + (b*n*((d*(137*d^4 + 385*d^3*e*x + 470
*d^2*e^2*x^2 + 270*d*e^3*x^3 + 60*e^4*x^4))/(d + e*x)^5 + 60*Log[x] - 60*L
og[d + e*x]))/(60*d^6))/(6*e)
```

3.70.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 119, normalized size of antiderivative = 0.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$, Rules used = {2756, 54, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{bn\int \frac{1}{x(d+ex)^6}dx}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}$$

$$\Big\downarrow \text{54}$$

$$\frac{bn\int \left(-\frac{e}{d^6(d+ex)}-\frac{e}{d^5(d+ex)^2}-\frac{e}{d^4(d+ex)^3}-\frac{e}{d^3(d+ex)^4}-\frac{e}{d^2(d+ex)^5}-\frac{e}{d(d+ex)^6}+\frac{1}{d^6x}\right)dx}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x)^7,x]
```

output
```
-1/6*(a + b*Log[c*x^n])/(e*(d + e*x)^6) + (b*n*(1/(5*d*(d + e*x)^5) + 1/(4
*d^2*(d + e*x)^4) + 1/(3*d^3*(d + e*x)^3) + 1/(2*d^4*(d + e*x)^2) + 1/(d^5
*(d + e*x)) + Log[x]/d^6 - Log[d + e*x]/d^6))/(6*e)
```

3.70.3.1 Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

3.70.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 385 vs. $2(139) = 278$.

Time = 1.32 (sec) , antiderivative size = 386, normalized size of antiderivative = 2.54

method	result
parallelrisch	$\frac{-360 \ln(ex+d)x^5 bd\, e^{10} n+900 \ln(x) x^4 b\, d^2 e^9 n-900 \ln(ex+d) x^4 b\, d^2 e^9 n+1200 \ln(x) x^3 b\, d^3 e^8 n-1200 \ln(ex+d) x^3 b\, d^3 e^8 n+360 \ln}{}$
risch	$-\frac{b \ln(x^n)}{6e(ex+d)^6}-\frac{900 \ln(ex+d) b\, d^2 e^4 n\, x^4-360 \ln(-x) bd\, e^5 n\, x^5-30 i\pi b\, d^6 \operatorname{csgn}(ic\, x^n)^3+900 \ln(ex+d) b\, d^4 e^2 n\, x^2-137 b\, d^6 n-9}{}$

input
```
int((a+b*ln(c*x^n))/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
1/360*(-360*ln(e*x+d)*x^5*b*d*e^10*n+900*ln(x)*x^4*b*d^2*e^9*n-900*ln(e*x+
d)*x^4*b*d^2*e^9*n+1200*ln(x)*x^3*b*d^3*e^8*n-1200*ln(e*x+d)*x^3*b*d^3*e^8
*n+360*ln(x)*x^5*b*d*e^10*n+60*ln(x)*x^6*b*e^11*n-60*ln(e*x+d)*x^6*b*e^11*
n+900*x^4*a*d^2*e^9+360*x^5*a*d*e^10+360*x*a*d^5*e^6+900*x^2*a*d^4*e^7+120
0*x^3*a*d^3*e^8-2000*x^3*b*d^3*e^8*n-1200*x^2*b*d^4*e^7*n-300*x*b*d^5*e^6*
n+60*ln(x)*b*d^6*e^5*n-60*ln(e*x+d)*b*d^6*e^5*n+900*ln(x)*x^2*b*d^4*e^7*n-
900*ln(e*x+d)*x^2*b*d^4*e^7*n+360*ln(x)*x*b*d^5*e^6*n-360*ln(e*x+d)*x*b*d^
5*e^6*n-762*x^5*b*d*e^10*n-1725*x^4*b*d^2*e^9*n-137*x^6*b*e^11*n-60*ln(c*x
^n)*b*d^6*e^5+60*x^6*a*e^11)/e^6/d^6/(e*x+d)^6
```

3.70.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 310 vs. 2(136) = 272.

Time = 0.32 (sec) , antiderivative size = 310, normalized size of antiderivative = 2.04

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx = \frac{60\,bde^5nx^5 + 330\,bd^2e^4nx^4 + 740\,bd^3e^3nx^3 + 855\,bd^4e^2nx^2 + 522\,bd^5enx + 137\,bd^6n - 60\,bd^6\log(c) - 60\,\cdots}{\cdots}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="fricas")
```

output
```
1/360*(60*b*d*e^5*n*x^5 + 330*b*d^2*e^4*n*x^4 + 740*b*d^3*e^3*n*x^3 + 855*
b*d^4*e^2*n*x^2 + 522*b*d^5*e*n*x + 137*b*d^6*n - 60*b*d^6*log(c) - 60*a*d
^6 - 60*(b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4 + 20*b*d^3*e^3
*n*x^3 + 15*b*d^4*e^2*n*x^2 + 6*b*d^5*e*n*x + b*d^6*n)*log(e*x + d) + 60*(
b*e^6*n*x^6 + 6*b*d*e^5*n*x^5 + 15*b*d^2*e^4*n*x^4 + 20*b*d^3*e^3*n*x^3 +
15*b*d^4*e^2*n*x^2 + 6*b*d^5*e*n*x)*log(x))/(d^6*e^7*x^6 + 6*d^7*e^6*x^5 +
 15*d^8*e^5*x^4 + 20*d^9*e^4*x^3 + 15*d^10*e^3*x^2 + 6*d^11*e^2*x + d^12*e
)
```

3.70.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1955 vs. 2(134) = 268.

Time = 76.21 (sec) , antiderivative size = 1955, normalized size of antiderivative = 12.86

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d)**7,x)
```

output
```
Piecewise((zoo*(-a/(6*x**6) - b*n/(36*x**6) - b*log(c*x**n)/(6*x**6)), Eq(
d, 0) & Eq(e, 0)), ((a*x - b*n*x + b*x*log(c*x**n))/d**7, Eq(e, 0)), ((-a/
(6*x**6) - b*n/(36*x**6) - b*log(c*x**n)/(6*x**6))/e**7, Eq(d, 0)), (-60*a
*d**6/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*
e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6
) - 60*b*d**6*n*log(d/e + x)/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10
*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x*
*5 + 360*d**6*e**7*x**6) + 137*b*d**6*n/(360*d**12*e + 2160*d**11*e**2*x +
 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d
**7*e**6*x**5 + 360*d**6*e**7*x**6) - 360*b*d**5*e*n*x*log(d/e + x)/(360*d
**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 +
5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) + 522*b*d*
*5*e*n*x/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d*
*9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x
**6) + 360*b*d**5*e*x*log(c*x**n)/(360*d**12*e + 2160*d**11*e**2*x + 5400*
d**10*e**3*x**2 + 7200*d**9*e**4*x**3 + 5400*d**8*e**5*x**4 + 2160*d**7*e*
*6*x**5 + 360*d**6*e**7*x**6) - 900*b*d**4*e**2*n*x**2*log(d/e + x)/(360*d
**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 + 7200*d**9*e**4*x**3 +
5400*d**8*e**5*x**4 + 2160*d**7*e**6*x**5 + 360*d**6*e**7*x**6) + 855*b*d*
*4*e**2*n*x**2/(360*d**12*e + 2160*d**11*e**2*x + 5400*d**10*e**3*x**2 ...
```

3.70.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 276 vs. $2(136) = 272$.

Time = 0.21 (sec) , antiderivative size = 276, normalized size of antiderivative = 1.82

$$\int \frac{a + b\log(cx^n)}{(d + ex)^7} \, dx$$
$$= \frac{1}{360} bn \left(\frac{60 e^4 x^4 + 270 de^3 x^3 + 470 d^2 e^2 x^2 + 385 d^3 ex + 137 d^4}{d^5 e^6 x^5 + 5 d^6 e^5 x^4 + 10 d^7 e^4 x^3 + 10 d^8 e^3 x^2 + 5 d^9 e^2 x + d^{10} e} - \frac{60 \log(ex + d)}{d^6 e} + \frac{60 \log(x)}{d^6 e} \right) - \frac{b\log(cx^n)}{6(e^7 x^6 + 6 de^6 x^5 + 15 d^2 e^5 x^4 + 20 d^3 e^4 x^3 + 15 d^4 e^3 x^2 + 6 d^5 e^2 x + d^6 e)} - \frac{a}{6(e^7 x^6 + 6 de^6 x^5 + 15 d^2 e^5 x^4 + 20 d^3 e^4 x^3 + 15 d^4 e^3 x^2 + 6 d^5 e^2 x + d^6 e)}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/360*b*n*((60*e^4*x^4 + 270*d*e^3*x^3 + 470*d^2*e^2*x^2 + 385*d^3*e*x + 1
37*d^4)/(d^5*e^6*x^5 + 5*d^6*e^5*x^4 + 10*d^7*e^4*x^3 + 10*d^8*e^3*x^2 + 5
*d^9*e^2*x + d^10*e) - 60*log(e*x + d)/(d^6*e) + 60*log(x)/(d^6*e)) - 1/6*
b*log(c*x^n)/(e^7*x^6 + 6*d*e^6*x^5 + 15*d^2*e^5*x^4 + 20*d^3*e^4*x^3 + 15
*d^4*e^3*x^2 + 6*d^5*e^2*x + d^6*e) - 1/6*a/(e^7*x^6 + 6*d*e^6*x^5 + 15*d^
2*e^5*x^4 + 20*d^3*e^4*x^3 + 15*d^4*e^3*x^2 + 6*d^5*e^2*x + d^6*e)
```

3.70.8 Giac [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 252, normalized size of antiderivative = 1.66

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx$$
$$= -\frac{bn\log(x)}{6\left(e^7x^6+6\,de^6x^5+15\,d^2e^5x^4+20\,d^3e^4x^3+15\,d^4e^3x^2+6\,d^5e^2x+d^6e\right)}$$
$$+\frac{60\,be^5nx^5+330\,bde^4nx^4+740\,bd^2e^3nx^3+855\,bd^3e^2nx^2+522\,bd^4enx+137\,bd^5n-60\,bd^5\log(c)-60}{360\left(d^5e^7x^6+6\,d^6e^6x^5+15\,d^7e^5x^4+20\,d^8e^4x^3+15\,d^9e^3x^2+6\,d^{10}e^2x+d^{11}e\right)}$$
$$-\frac{bn\log(ex+d)}{6\,d^6e}+\frac{bn\log(x)}{6\,d^6e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^7,x, algorithm="giac")
```

output
```
-1/6*b*n*log(x)/(e^7*x^6 + 6*d*e^6*x^5 + 15*d^2*e^5*x^4 + 20*d^3*e^4*x^3 +
 15*d^4*e^3*x^2 + 6*d^5*e^2*x + d^6*e) + 1/360*(60*b*e^5*n*x^5 + 330*b*d*e
^4*n*x^4 + 740*b*d^2*e^3*n*x^3 + 855*b*d^3*e^2*n*x^2 + 522*b*d^4*e*n*x + 1
37*b*d^5*n - 60*b*d^5*log(c) - 60*a*d^5)/(d^5*e^7*x^6 + 6*d^6*e^6*x^5 + 15
*d^7*e^5*x^4 + 20*d^8*e^4*x^3 + 15*d^9*e^3*x^2 + 6*d^10*e^2*x + d^11*e) -
1/6*b*n*log(e*x + d)/(d^6*e) + 1/6*b*n*log(x)/(d^6*e)
```

3.70.9 Mupad [B] (verification not implemented)

Time = 0.75 (sec) , antiderivative size = 232, normalized size of antiderivative = 1.53

$$\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx$$
$$= \frac{\frac{137\,b\,n}{60}-a+\frac{57\,b\,e^2\,n\,x^2}{4\,d^2}+\frac{37\,b\,e^3\,n\,x^3}{3\,d^3}+\frac{11\,b\,e^4\,n\,x^4}{2\,d^4}+\frac{b\,e^5\,n\,x^5}{d^5}+\frac{87\,b\,e\,n\,x}{10\,d}}{6\,d^6\,e+36\,d^5\,e^2\,x+90\,d^4\,e^3\,x^2+120\,d^3\,e^4\,x^3+90\,d^2\,e^5\,x^4+36\,d\,e^6\,x^5+6\,e^7\,x^6}$$
$$-\frac{b\,\ln(c\,x^n)}{6\,e\,\left(d^6+6\,d^5\,e\,x+15\,d^4\,e^2\,x^2+20\,d^3\,e^3\,x^3+15\,d^2\,e^4\,x^4+6\,d\,e^5\,x^5+e^6\,x^6\right)}$$
$$-\frac{b\,n\,\mathrm{atanh}\left(\frac{2\,e\,x}{d}+1\right)}{3\,d^6\,e}$$

input
```
int((a + b*log(c*x^n))/(d + e*x)^7,x)
```

output
```
((137*b*n)/60 - a + (57*b*e^2*n*x^2)/(4*d^2) + (37*b*e^3*n*x^3)/(3*d^3) +
(11*b*e^4*n*x^4)/(2*d^4) + (b*e^5*n*x^5)/d^5 + (87*b*e*n*x)/(10*d))/(6*d^6
*e + 6*e^7*x^6 + 36*d^5*e^2*x + 36*d*e^6*x^5 + 90*d^4*e^3*x^2 + 120*d^3*e^
4*x^3 + 90*d^2*e^5*x^4) - (b*log(c*x^n))/(6*e*(d^6 + e^6*x^6 + 6*d*e^5*x^5
 + 15*d^4*e^2*x^2 + 20*d^3*e^3*x^3 + 15*d^2*e^4*x^4 + 6*d^5*e*x)) - (b*n*a
tanh((2*e*x)/d + 1))/(3*d^6*e)
```

3.70. $\int \frac{a+b\log(cx^n)}{(d+ex)^7}\,dx$

3.71 $\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx$

3.71.1 Optimal result

Integrand size = 21, antiderivative size = 294

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx = &-\frac{bn}{30d^2(d+ex)^5}-\frac{11bn}{120d^3(d+ex)^4}-\frac{37bn}{180d^4(d+ex)^3}\\ &-\frac{19bn}{40d^5(d+ex)^2}-\frac{29bn}{20d^6(d+ex)}-\frac{29bn\log(x)}{20d^7}+\frac{a+b\log(cx^n)}{6d(d+ex)^6}\\ &+\frac{a+b\log(cx^n)}{5d^2(d+ex)^5}+\frac{a+b\log(cx^n)}{4d^3(d+ex)^4}+\frac{a+b\log(cx^n)}{3d^4(d+ex)^3}+\frac{a+b\log(cx^n)}{2d^5(d+ex)^2}\\ &-\frac{ex(a+b\log(cx^n))}{d^7(d+ex)}-\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^7}\\ &+\frac{49bn\log(d+ex)}{20d^7}+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^7}\end{aligned}$$

output
```
-1/30*b*n/d^2/(e*x+d)^5-11/120*b*n/d^3/(e*x+d)^4-37/180*b*n/d^4/(e*x+d)^3-
19/40*b*n/d^5/(e*x+d)^2-29/20*b*n/d^6/(e*x+d)-29/20*b*n*ln(x)/d^7+1/6*(a+b
*ln(c*x^n))/d/(e*x+d)^6+1/5*(a+b*ln(c*x^n))/d^2/(e*x+d)^5+1/4*(a+b*ln(c*x^
n))/d^3/(e*x+d)^4+1/3*(a+b*ln(c*x^n))/d^4/(e*x+d)^3+1/2*(a+b*ln(c*x^n))/d^
5/(e*x+d)^2-e*x*(a+b*ln(c*x^n))/d^7/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))/d^
7+49/20*b*n*ln(e*x+d)/d^7+b*n*polylog(2,-d/e/x)/d^7
```

3.71.2 Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 349, normalized size of antiderivative = 1.19

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx = \frac{\frac{60ad^6}{(d+ex)^6}+\frac{72ad^5}{(d+ex)^5}-\frac{12bd^5n}{(d+ex)^5}+\frac{90ad^4}{(d+ex)^4}-\frac{33bd^4n}{(d+ex)^4}+\frac{120ad^3}{(d+ex)^3}-\frac{74bd^3n}{(d+ex)^3}+\frac{180ad^2}{(d+ex)^2}-\frac{171bd^2n}{(d+ex)^2}+\frac{360ad}{d+ex}-\frac{522bdn}{d+ex}-88}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^7),x]
```

output
```
((60*a*d^6)/(d + e*x)^6 + (72*a*d^5)/(d + e*x)^5 - (12*b*d^5*n)/(d + e*x)^
5 + (90*a*d^4)/(d + e*x)^4 - (33*b*d^4*n)/(d + e*x)^4 + (120*a*d^3)/(d + e
*x)^3 - (74*b*d^3*n)/(d + e*x)^3 + (180*a*d^2)/(d + e*x)^2 - (171*b*d^2*n)
/(d + e*x)^2 + (360*a*d)/(d + e*x) - (522*b*d*n)/(d + e*x) - 882*b*n*Log[x
] + (360*a*Log[c*x^n])/n + (60*b*d^6*Log[c*x^n])/(d + e*x)^6 + (72*b*d^5*L
og[c*x^n])/(d + e*x)^5 + (90*b*d^4*Log[c*x^n])/(d + e*x)^4 + (120*b*d^3*Lo
g[c*x^n])/(d + e*x)^3 + (180*b*d^2*Log[c*x^n])/(d + e*x)^2 + (360*b*d*Log[
c*x^n])/(d + e*x) + (180*b*Log[c*x^n]^2)/n + 882*b*n*Log[d + e*x] - 360*a*
Log[1 + (e*x)/d] - 360*b*Log[c*x^n]*Log[1 + (e*x)/d] - 360*b*n*PolyLog[2,
-((e*x)/d)])/(360*d^7)
```

3.71.3 Rubi [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 604 vs. 2(294) = 588.

Time = 2.64 (sec) , antiderivative size = 604, normalized size of antiderivative = 2.05, number of steps used = 25, number of rules used = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 1.190, Rules used = {2789, 2756, 54, 2009, 2789, 2756, 54, 2009, 2789, 2756, 54, 2009, 2789, 2756, 54, 2009, 2789, 2756, 54, 2009, 2789, 2751, 16, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx$$

$$\Big\downarrow \text{2789}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^6}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^7}dx}{d}$$

$$\Big\downarrow \text{ 2756}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^6}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^6}dx}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \text{ 54}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^6}dx}{d}-\frac{e\left(\frac{bn\int \left(-\frac{e}{d^6(d+ex)}-\frac{e}{d^5(d+ex)^2}-\frac{e}{d^4(d+ex)^3}-\frac{e}{d^3(d+ex)^4}-\frac{e}{d^2(d+ex)^5}-\frac{e}{d(d+ex)^6}+\frac{1}{d^6x}\right)dx}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^6}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \text{ 2789}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^5}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^6}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \text{ 2756}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^5}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^5}dx}{5e}-\frac{a+b\log(cx^n)}{5e(d+ex)^5}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \text{ 54}$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^5}dx}{d}-\frac{e\left(\frac{bn\int \left(-\frac{e}{d^5(d+ex)}-\frac{e}{d^4(d+ex)^2}-\frac{e}{d^3(d+ex)^3}-\frac{e}{d^2(d+ex)^4}-\frac{e}{d(d+ex)^5}+\frac{1}{d^5x}\right)dx}{5e}-\frac{a+b\log(cx^n)}{5e(d+ex)^5}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

3.71. $\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx$

$$\Big\downarrow \; 2009$$

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^5}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\frac{\log(x)}{d^5}+\frac{1}{d^4(d+ex)}+\frac{1}{2d^3(d+ex)^2}+\frac{1}{3d^2(d+ex)^3}+\frac{1}{4d(d+ex)^4}\right)}{5e}-\frac{a+b\log(cx^n)}{5e(d+ex)^5}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \; 2789$$

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^4}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^5}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\frac{\log(x)}{d^5}+\frac{1}{d^4(d+ex)}+\frac{1}{2d^3(d+ex)^2}+\frac{1}{3d^2(d+ex)^3}+\frac{1}{4d(d+ex)^4}\right)}{5e}-\frac{a+b\log(cx^n)}{5e(d+ex)^5}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \; 2756$$

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^4}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^4}dx}{4e}-\frac{a+b\log(cx^n)}{4e(d+ex)^4}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\frac{\log(x)}{d^5}+\frac{1}{d^4(d+ex)}+\frac{1}{2d^3(d+ex)^2}+\frac{1}{3d^2(d+ex)^3}+\frac{1}{4d(d+ex)^4}\right)}{5e}-\frac{a+b\log(cx^n)}{5e(d+ex)^5}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \; 54$$

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^4}dx}{d}-\frac{e\left(\frac{bn\int \left(-\frac{e}{d^4(d+ex)}-\frac{e}{d^3(d+ex)^2}-\frac{e}{d^2(d+ex)^3}-\frac{e}{d(d+ex)^4}+\frac{1}{d^4x}\right)dx}{4e}-\frac{a+b\log(cx^n)}{4e(d+ex)^4}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\frac{\log(x)}{d^5}+\frac{1}{d^4(d+ex)}+\frac{1}{2d^3(d+ex)^2}+\frac{1}{3d^2(d+ex)^3}+\frac{1}{4d(d+ex)^4}\right)}{5e}-\frac{a+b\log(cx^n)}{5e(d+ex)^5}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \; 2009$$

3.71. $\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx$

$$\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^4}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex)}+\frac{1}{2d^2(d+ex)^2}+\frac{1}{3d(d+ex)^3}\right)}{4e}-\frac{a+b\log(cx^n)}{4e(d+ex)^4}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\frac{\log(x)}{d^5}+\frac{1}{d^4(d+ex)}+\frac{1}{2d^3(\cdots}{5e}\cdots\right.}{\cdots}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 2789

$$\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^4}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex)}+\frac{1}{2d^2(d+ex)^2}+\frac{1}{3d(d+ex)^3}\right)}{4e}-\frac{a+b\log(cx^n)}{4e(d+ex)^4}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^5}+\frac{\log\cdots}{d\cdots}\cdots\right.}{\cdots}\cdots\right.}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 2756

$$\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^3}dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex)}+\frac{1}{2d^2(d+ex)^2}+\frac{1}{3d(d+ex)^3}\right)}{4e}-\frac{a+b\log(cx^n)}{4e(d+ex)^4}\right)}{d}}{d}-\frac{e\left(\frac{bn\cdots}{\cdots}\cdots\right.}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 54

$$\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{bn\int \left(-\frac{e}{d^3(d+ex)}-\frac{e}{d^2(d+ex)^2}-\frac{e}{d(d+ex)^3}+\frac{1}{d^3x}\right)dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex)}+\frac{1}{2d^2(d+ex)^2}+\frac{1}{3d(d+\cdots}\cdots\right.}{4e}\cdots\right.}{d}}{d}\cdots}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\Big\downarrow$ 2009

3.71. $\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx$

$$\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex)}+\frac{1}{2d^2(d+ex)^2}+\frac{1}{3d(d+e\cdots}\cdots\right)}{4e}\cdots\right)}{d}}{d}\cdots}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\downarrow$ 2789

$$\frac{\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^3}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\frac{\log(x)}{d^4}+\frac{1}{d^3(d+ex)}+\cdots\right)}{4e}\cdots\right)}{\cdots}}{d}\cdots}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\downarrow$ 2756

$$\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^2}dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^4}+\cdots\right)}{\cdots}\cdots\right)}{\cdots}}{d}\cdots$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\downarrow$ 54

$$\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int\left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{1}{d^2x}\right)dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}-\cdots}{d}\cdots$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$\downarrow$ 2009

3.71. $\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx$

$$\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex)^3}\right)}{d}}{d}-\frac{e(\cdots}{\cdots}}{d}\cdots$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \ 2789$$

$$\frac{\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex)}+\frac{1}{2d(d+ex)^2}\right)}{3e}-\cdots\right)}{d}}{d}\cdots}{d}\cdots$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \ 2751$$

$$\frac{\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int\frac{1}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+e\cdots}\cdots\right)}{3e}\cdots\right)}{d}}{d}\cdots}{d}\cdots$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \ 16$$

$$\frac{\frac{\frac{\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^3}+\frac{\log(x)}{d^3}+\frac{1}{d^2(d+ex\cdots}\cdots\right)}{3e}\cdots\right)}{d}}{d}\cdots}{d}\cdots$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \ 2779$$

3.71. $\int \frac{a+b\log(cx^n)}{x(d+ex)^7}dx$

$$\frac{\frac{\frac{\frac{\frac{\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\cdots\right)}{\cdots}\cdots\right)}{\cdots}}{d}\cdots}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

$$\Big\downarrow \; 2838$$

$$\frac{\frac{\frac{\frac{\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(\cdots\right)}{\cdots}\cdots\right)}{\cdots}}{d}\cdots}{d}$$

$$\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^6}+\frac{\log(x)}{d^6}+\frac{1}{d^5(d+ex)}+\frac{1}{2d^4(d+ex)^2}+\frac{1}{3d^3(d+ex)^3}+\frac{1}{4d^2(d+ex)^4}+\frac{1}{5d(d+ex)^5}\right)}{6e}-\frac{a+b\log(cx^n)}{6e(d+ex)^6}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x)^7),x]
```

output
```
-((e*(-1/6*(a + b*Log[c*x^n])/(e*(d + e*x)^6) + (b*n*(1/(5*d*(d + e*x)^5)
+ 1/(4*d^2*(d + e*x)^4) + 1/(3*d^3*(d + e*x)^3) + 1/(2*d^4*(d + e*x)^2) +
1/(d^5*(d + e*x)) + Log[x]/d^6 - Log[d + e*x]/d^6))/(6*e)))/d) + (-((e*(-1
/5*(a + b*Log[c*x^n])/(e*(d + e*x)^5) + (b*n*(1/(4*d*(d + e*x)^4) + 1/(3*d
^2*(d + e*x)^3) + 1/(2*d^3*(d + e*x)^2) + 1/(d^4*(d + e*x)) + Log[x]/d^5 -
 Log[d + e*x]/d^5))/(5*e)))/d) + (-((e*(-1/4*(a + b*Log[c*x^n])/(e*(d + e*
x)^4) + (b*n*(1/(3*d*(d + e*x)^3) + 1/(2*d^2*(d + e*x)^2) + 1/(d^3*(d + e*
x)) + Log[x]/d^4 - Log[d + e*x]/d^4))/(4*e)))/d) + (-((e*(-1/3*(a + b*Log[
c*x^n])/(e*(d + e*x)^3) + (b*n*(1/(2*d*(d + e*x)^2) + 1/(d^2*(d + e*x)) +
Log[x]/d^3 - Log[d + e*x]/d^3))/(3*e)))/d) + (-((e*(-1/2*(a + b*Log[c*x^n]
)/(e*(d + e*x)^2) + (b*n*(1/(d*(d + e*x)) + Log[x]/d^2 - Log[d + e*x]/d^2)
)/(2*e)))/d) + (-((e*((x*(a + b*Log[c*x^n]))/(d*(d + e*x)) - (b*n*Log[d +
e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d) + (b*n*Poly
Log[2, -(d/(e*x))])/d)/d)/d)/d)/d)/d)/d
```

3.71. $\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx$

3.71.3.1 Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.71.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 2.21 (sec) , antiderivative size = 445, normalized size of antiderivative = 1.51

method	result
risch	$-\frac{b\ln(x^n)\ln(ex+d)}{d^7}+\frac{b\ln(x^n)}{d^6(ex+d)}+\frac{b\ln(x^n)}{2d^5(ex+d)^2}+\frac{b\ln(x^n)}{3d^4(ex+d)^3}+\frac{b\ln(x^n)}{4d^3(ex+d)^4}+\frac{b\ln(x^n)}{5d^2(ex+d)^5}+\frac{b\ln(x^n)}{6d(ex+d)^6}+\frac{b\ln(x^n)\ln}{d^7}$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d^7*ln(e*x+d)+b*ln(x^n)/d^6/(e*x+d)+1/2*b*ln(x^n)/d^5/(e*x+d)^2
+1/3*b*ln(x^n)/d^4/(e*x+d)^3+1/4*b*ln(x^n)/d^3/(e*x+d)^4+1/5*b*ln(x^n)/d^2
/(e*x+d)^5+1/6*b*ln(x^n)/d/(e*x+d)^6+b*ln(x^n)/d^7*ln(x)-29/20*b*n/d^6/(e*
x+d)-19/40*b*n/d^5/(e*x+d)^2-37/180*b*n/d^4/(e*x+d)^3-11/120*b*n/d^3/(e*x+
d)^4-1/30*b*n/d^2/(e*x+d)^5+49/20*b*n*ln(e*x+d)/d^7-49/20*b*n*ln(x)/d^7-1/
2*b*n/d^7*ln(x)^2+b*n/d^7*ln(e*x+d)*ln(-e*x/d)+b*n/d^7*dilog(-e*x/d)+(-1/2
*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*
x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b
*ln(c)+a)*(-1/d^7*ln(e*x+d)+1/d^6/(e*x+d)+1/2/d^5/(e*x+d)^2+1/3/d^4/(e*x+d
)^3+1/4/d^3/(e*x+d)^4+1/5/d^2/(e*x+d)^5+1/6/d/(e*x+d)^6+1/d^7*ln(x))
```

3.71.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^7x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^7,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^7*x^8 + 7*d*e^6*x^7 + 21*d^2*e^5*x^6 + 35*d
^3*e^4*x^5 + 35*d^4*e^3*x^4 + 21*d^5*e^2*x^3 + 7*d^6*e*x^2 + d^7*x), x)
```

3.71.6 Sympy [A] (verification not implemented)

Time = 156.44 (sec) , antiderivative size = 1518, normalized size of antiderivative = 5.16

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d)**7,x)
```

output
```
-a*e*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/d - a*e*
Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/d**2 - a*e*Pi
ecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))/d**3 - a*e*Piec
ewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True))/d**4 - a*e*Piecew
ise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))/d**5 - a*e*Piecewis
e((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), True))/d**6 - a*e*Piecewise((x/d
, Eq(e, 0)), (log(d + e*x)/e, True))/d**7 + a*log(x)/d**7 + b*e**6*n*Piece
wise((-1/(e**7*x), Eq(d, 0)), (-137*d**4/(360*d**5*e**6 + 1800*d**4*e**7*x
 + 3600*d**3*e**8*x**2 + 3600*d**2*e**9*x**3 + 1800*d*e**10*x**4 + 360*e**
11*x**5) - 625*d**3*e*x/(360*d**5*e**6 + 1800*d**4*e**7*x + 3600*d**3*e**8
*x**2 + 3600*d**2*e**9*x**3 + 1800*d*e**10*x**4 + 360*e**11*x**5) - 1100*d
**2*e**2*x**2/(360*d**5*e**6 + 1800*d**4*e**7*x + 3600*d**3*e**8*x**2 + 36
00*d**2*e**9*x**3 + 1800*d*e**10*x**4 + 360*e**11*x**5) - 900*d*e**3*x**3/
(360*d**5*e**6 + 1800*d**4*e**7*x + 3600*d**3*e**8*x**2 + 3600*d**2*e**9*x
**3 + 1800*d*e**10*x**4 + 360*e**11*x**5) - 300*e**4*x**4/(360*d**5*e**6 +
 1800*d**4*e**7*x + 3600*d**3*e**8*x**2 + 3600*d**2*e**9*x**3 + 1800*d*e**
10*x**4 + 360*e**11*x**5) - log(d + e*x)/(6*d*e**6), True))/d**6 - b*e**6*
Piecewise((1/(e**7*x), Eq(d, 0)), (-1/(6*d*(d/x + e)**6), True))*log(c*x**
n)/d**6 - 6*b*e**5*n*Piecewise((-1/(e**6*x), Eq(d, 0)), (-25*d**3/(60*d**4
*e**5 + 240*d**3*e**6*x + 360*d**2*e**7*x**2 + 240*d*e**8*x**3 + 60*e**...
```

3.71.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^7x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/60*a*((60*e^5*x^5 + 330*d*e^4*x^4 + 740*d^2*e^3*x^3 + 855*d^3*e^2*x^2 +
522*d^4*e*x + 147*d^5)/(d^6*e^6*x^6 + 6*d^7*e^5*x^5 + 15*d^8*e^4*x^4 + 20*
d^9*e^3*x^3 + 15*d^10*e^2*x^2 + 6*d^11*e*x + d^12) - 60*log(e*x + d)/d^7 +
 60*log(x)/d^7) + b*integrate((log(c) + log(x^n))/(e^7*x^8 + 7*d*e^6*x^7 +
 21*d^2*e^5*x^6 + 35*d^3*e^4*x^5 + 35*d^4*e^3*x^4 + 21*d^5*e^2*x^3 + 7*d^6
*e*x^2 + d^7*x), x)
```

3.71.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)^7x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^7,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^7*x), x)
```

3.71.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^7}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x)^7}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^7),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^7), x)
```

3.72 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx$

3.72.1 Optimal result

Integrand size = 21, antiderivative size = 339

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx = &-\frac{bn}{d^7x}+\frac{ben}{30d^3(d+ex)^5}+\frac{17ben}{120d^4(d+ex)^4}+\frac{79ben}{180d^5(d+ex)^3}\\ &+\frac{53ben}{40d^6(d+ex)^2}+\frac{103ben}{20d^7(d+ex)}+\frac{103ben\log(x)}{20d^8}\\ &-\frac{a+b\log(cx^n)}{d^7x}-\frac{e(a+b\log(cx^n))}{6d^2(d+ex)^6}-\frac{2e(a+b\log(cx^n))}{5d^3(d+ex)^5}\\ &-\frac{3e(a+b\log(cx^n))}{4d^4(d+ex)^4}-\frac{4e(a+b\log(cx^n))}{3d^5(d+ex)^3}-\frac{5e(a+b\log(cx^n))}{2d^6(d+ex)^2}\\ &+\frac{6e^2x(a+b\log(cx^n))}{d^8(d+ex)}+\frac{7e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^8}\\ &-\frac{223ben\log(d+ex)}{20d^8}-\frac{7ben\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^8}\end{aligned}$$

output
```
-b*n/d^7/x+1/30*b*e*n/d^3/(e*x+d)^5+17/120*b*e*n/d^4/(e*x+d)^4+79/180*b*e*
n/d^5/(e*x+d)^3+53/40*b*e*n/d^6/(e*x+d)^2+103/20*b*e*n/d^7/(e*x+d)+103/20*
b*e*n*ln(x)/d^8+(-a-b*ln(c*x^n))/d^7/x-1/6*e*(a+b*ln(c*x^n))/d^2/(e*x+d)^6
-2/5*e*(a+b*ln(c*x^n))/d^3/(e*x+d)^5-3/4*e*(a+b*ln(c*x^n))/d^4/(e*x+d)^4-4
/3*e*(a+b*ln(c*x^n))/d^5/(e*x+d)^3-5/2*e*(a+b*ln(c*x^n))/d^6/(e*x+d)^2+6*e
^2*x*(a+b*ln(c*x^n))/d^8/(e*x+d)+7*e*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^8-223/2
0*b*e*n*ln(e*x+d)/d^8-7*b*e*n*polylog(2,-d/e/x)/d^8
```

3.72.2 Mathematica [A] (verified)

Time = 0.39 (sec) , antiderivative size = 401, normalized size of antiderivative = 1.18

$$\int \frac{a+b\log (cx^n)}{x^2(d+ex)^7}\,dx =$$
$$-\frac{\frac{360ad}{x}+\frac{360bdn}{x}+\frac{60ad^6e}{(d+ex)^6}+\frac{144ad^5e}{(d+ex)^5}-\frac{12bd^5en}{(d+ex)^5}+\frac{270ad^4e}{(d+ex)^4}-\frac{51bd^4en}{(d+ex)^4}+\frac{480ad^3e}{(d+ex)^3}-\frac{158bd^3en}{(d+ex)^3}+\frac{900ad^2e}{(d+ex)^2}-\frac{477bd^2en}{(d+ex)^2}+}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^7),x]
```

output
```
-1/360*((360*a*d)/x + (360*b*d*n)/x + (60*a*d^6*e)/(d + e*x)^6 + (144*a*d^
5*e)/(d + e*x)^5 - (12*b*d^5*e*n)/(d + e*x)^5 + (270*a*d^4*e)/(d + e*x)^4
- (51*b*d^4*e*n)/(d + e*x)^4 + (480*a*d^3*e)/(d + e*x)^3 - (158*b*d^3*e*n)
/(d + e*x)^3 + (900*a*d^2*e)/(d + e*x)^2 - (477*b*d^2*e*n)/(d + e*x)^2 + (
2160*a*d*e)/(d + e*x) - (1854*b*d*e*n)/(d + e*x) - 4014*b*e*n*Log[x] + (25
20*a*e*Log[c*x^n])/n + (360*b*d*Log[c*x^n])/x + (60*b*d^6*e*Log[c*x^n])/(d
 + e*x)^6 + (144*b*d^5*e*Log[c*x^n])/(d + e*x)^5 + (270*b*d^4*e*Log[c*x^n]
)/(d + e*x)^4 + (480*b*d^3*e*Log[c*x^n])/(d + e*x)^3 + (900*b*d^2*e*Log[c*
x^n])/(d + e*x)^2 + (2160*b*d*e*Log[c*x^n])/(d + e*x) + (1260*b*e*Log[c*x^
n]^2)/n + 4014*b*e*n*Log[d + e*x] - 2520*a*e*Log[1 + (e*x)/d] - 2520*b*e*L
og[c*x^n]*Log[1 + (e*x)/d] - 2520*b*e*n*PolyLog[2, -((e*x)/d)])/d^8
```

3.72.3 Rubi [A] (verified)

Time = 0.80 (sec) , antiderivative size = 339, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log (cx^n)}{x^2(d+ex)^7}\,dx$$
$$\Big\downarrow \; 2793$$
$$\int \left(\frac{6e^2(a+b\log (cx^n))}{d^7(d+ex)^2}-\frac{7e(a+b\log (cx^n))}{d^7x(d+ex)}+\frac{a+b\log (cx^n)}{d^7x^2}+\frac{5e^2(a+b\log (cx^n))}{d^6(d+ex)^3}+\frac{4e^2(a+b\log (cx^n))}{d^5(d+ex)^4}+\right.$$
$$\Big\downarrow \; 2009$$

$$\frac{6e^2x(a+b\log(cx^n))}{d^8(d+ex)}+\frac{7e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^8}-\frac{a+b\log(cx^n)}{d^7x}-\frac{5e(a+b\log(cx^n))}{2d^6(d+ex)^2}-\frac{4e(a+b\log(cx^n))}{3d^5(d+ex)^3}-\frac{3e(a+b\log(cx^n))}{4d^4(d+ex)^4}-\frac{2e(a+b\log(cx^n))}{5d^3(d+ex)^5}-\frac{e(a+b\log(cx^n))}{6d^2(d+ex)^6}-\frac{7ben\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^8}+\frac{103ben\log(x)}{20d^8}-\frac{223ben\log(d+ex)}{20d^8}+\frac{103ben}{20d^7(d+ex)}-\frac{bn}{d^7x}+\frac{53ben}{40d^6(d+ex)^2}+\frac{79ben}{180d^5(d+ex)^3}+\frac{17ben}{120d^4(d+ex)^4}+\frac{ben}{30d^3(d+ex)^5}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^7),x]
```

output
```
-((b*n)/(d^7*x)) + (b*e*n)/(30*d^3*(d + e*x)^5) + (17*b*e*n)/(120*d^4*(d +
 e*x)^4) + (79*b*e*n)/(180*d^5*(d + e*x)^3) + (53*b*e*n)/(40*d^6*(d + e*x)
^2) + (103*b*e*n)/(20*d^7*(d + e*x)) + (103*b*e*n*Log[x])/(20*d^8) - (a +
b*Log[c*x^n])/(d^7*x) - (e*(a + b*Log[c*x^n]))/(6*d^2*(d + e*x)^6) - (2*e*
(a + b*Log[c*x^n]))/(5*d^3*(d + e*x)^5) - (3*e*(a + b*Log[c*x^n]))/(4*d^4*
(d + e*x)^4) - (4*e*(a + b*Log[c*x^n]))/(3*d^5*(d + e*x)^3) - (5*e*(a + b*
Log[c*x^n]))/(2*d^6*(d + e*x)^2) + (6*e^2*x*(a + b*Log[c*x^n]))/(d^8*(d +
e*x)) + (7*e*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^8 - (223*b*e*n*Log[d +
 e*x])/(20*d^8) - (7*b*e*n*PolyLog[2, -(d/(e*x))])/d^8
```

3.72.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.72.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 2.68 (sec) , antiderivative size = 508, normalized size of antiderivative = 1.50

method	result
risch	$-\frac{b\ln(x^n)e}{6d^2(ex+d)^6}+\frac{7b\ln(x^n)e\ln(ex+d)}{d^8}-\frac{6b\ln(x^n)e}{d^7(ex+d)}-\frac{5b\ln(x^n)e}{2d^6(ex+d)^2}-\frac{4b\ln(x^n)e}{3d^5(ex+d)^3}-\frac{3b\ln(x^n)e}{4d^4(ex+d)^4}-\frac{2b\ln(x^n)e}{5d^3(ex+d)^5}-\frac{b\ln(x^n}{d^7x}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
-1/6*b*ln(x^n)/d^2/(e*x+d)^6*e+7*b*ln(x^n)/d^8*e*ln(e*x+d)-6*b*ln(x^n)/d^7
*e/(e*x+d)-5/2*b*ln(x^n)/d^6/(e*x+d)^2*e-4/3*b*ln(x^n)/d^5/(e*x+d)^3*e-3/4
*b*ln(x^n)/d^4/(e*x+d)^4*e-2/5*b*ln(x^n)/d^3/(e*x+d)^5*e-b*ln(x^n)/d^7/x-7
*b*ln(x^n)/d^8*e*ln(x)+7/2*b*n/d^8*e*ln(x)^2-7*b*n/d^8*e*ln(e*x+d)*ln(-e*x
/d)-7*b*n/d^8*e*dilog(-e*x/d)+103/20*b*e*n/d^7/(e*x+d)-223/20*b*e*n*ln(e*x
+d)/d^8+53/40*b*e*n/d^6/(e*x+d)^2+79/180*b*e*n/d^5/(e*x+d)^3+17/120*b*e*n/
d^4/(e*x+d)^4+1/30*b*e*n/d^3/(e*x+d)^5-b*n/d^7/x+223/20*b*e*n*ln(x)/d^8+(-
1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I
*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^
3+b*ln(c)+a)*(-1/6/d^2/(e*x+d)^6*e+7/d^8*e*ln(e*x+d)-6/d^7*e/(e*x+d)-5/2/d
^6/(e*x+d)^2*e-4/3/d^5/(e*x+d)^3*e-3/4/d^4/(e*x+d)^4*e-2/5/d^3/(e*x+d)^5*e
-1/d^7/x-7/d^8*e*ln(x))
```

3.72.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)^7x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^7,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^7*x^9 + 7*d*e^6*x^8 + 21*d^2*e^5*x^7 + 35*d
^3*e^4*x^6 + 35*d^4*e^3*x^5 + 21*d^5*e^2*x^4 + 7*d^6*e*x^3 + d^7*x^2), x)
```

3.72.6 Sympy [A] (verification not implemented)

Time = 146.27 (sec) , antiderivative size = 1685, normalized size of antiderivative = 4.97

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**7,x)
```

output
```
a*e**2*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/d**2 +
 2*a*e**2*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/d**
3 + 3*a*e**2*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))/
d**4 + 4*a*e**2*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), True
))/d**5 + 5*a*e**2*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), T
rue))/d**6 + 6*a*e**2*Piecewise((x/d**2, Eq(e, 0)), (-1/(d*e + e**2*x), Tr
ue))/d**7 - a/(d**7*x) + 7*a*e**2*Piecewise((x/d, Eq(e, 0)), (log(d + e*x)
/e, True))/d**8 - 7*a*e*log(x)/d**8 - b*e**2*n*Piecewise((x/d**7, Eq(e, 0)
), (-137*d**4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600
*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 385*d**3*e*x
/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x*
*3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 470*d**2*e**2*x**2/(360*d
**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 18
00*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 270*d*e**3*x**3/(360*d**10*e + 1
800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e*
*5*x**4 + 360*d**5*e**6*x**5) - 60*e**4*x**4/(360*d**10*e + 1800*d**9*e**2
*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360
*d**5*e**6*x**5) - log(x)/(6*d**6*e) + log(d/e + x)/(6*d**6*e), True))/d**
2 + b*e**2*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))*lo
g(c*x**n)/d**2 - 2*b*e**2*n*Piecewise((x/d**6, Eq(e, 0)), (-25*d**3/(60...
```

3.72.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^7x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^7,x, algorithm="maxima")
```

output
```
-1/60*a*((420*e^6*x^6 + 2310*d*e^5*x^5 + 5180*d^2*e^4*x^4 + 5985*d^3*e^3*x
^3 + 3654*d^4*e^2*x^2 + 1029*d^5*e*x + 60*d^6)/(d^7*e^6*x^7 + 6*d^8*e^5*x^
6 + 15*d^9*e^4*x^5 + 20*d^10*e^3*x^4 + 15*d^11*e^2*x^3 + 6*d^12*e*x^2 + d^
13*x) - 420*e*log(e*x + d)/d^8 + 420*e*log(x)/d^8) + b*integrate((log(c) +
 log(x^n))/(e^7*x^9 + 7*d*e^6*x^8 + 21*d^2*e^5*x^7 + 35*d^3*e^4*x^6 + 35*d
^4*e^3*x^5 + 21*d^5*e^2*x^4 + 7*d^6*e*x^3 + d^7*x^2), x)
```

3.72.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^7x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^7,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^7*x^2), x)
```

3.72.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^7}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(d+e\,x)^7}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^7),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^7), x)
```

3.73 $\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx$

3.73.1 Optimal result

Integrand size = 21, antiderivative size = 401

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx = &-\frac{bn}{4d^7x^2}+\frac{7ben}{d^8x}-\frac{be^2n}{30d^4(d+ex)^5}-\frac{23be^2n}{120d^5(d+ex)^4}-\frac{34be^2n}{45d^6(d+ex)^3}\\&-\frac{14be^2n}{5d^7(d+ex)^2}-\frac{131be^2n}{10d^8(d+ex)}-\frac{131be^2n\log(x)}{10d^9}-\frac{a+b\log(cx^n)}{2d^7x^2}\\&+\frac{7e(a+b\log(cx^n))}{d^8x}+\frac{e^2(a+b\log(cx^n))}{6d^3(d+ex)^6}+\frac{3e^2(a+b\log(cx^n))}{5d^4(d+ex)^5}\\&+\frac{3e^2(a+b\log(cx^n))}{2d^5(d+ex)^4}+\frac{10e^2(a+b\log(cx^n))}{3d^6(d+ex)^3}+\frac{15e^2(a+b\log(cx^n))}{2d^7(d+ex)^2}\\&-\frac{21e^3x(a+b\log(cx^n))}{d^9(d+ex)}-\frac{28e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^9}\\&+\frac{341be^2n\log(d+ex)}{10d^9}+\frac{28be^2n\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^9}\end{aligned}$$

output
```
-1/4*b*n/d^7/x^2+7*b*e*n/d^8/x-1/30*b*e^2*n/d^4/(e*x+d)^5-23/120*b*e^2*n/d
^5/(e*x+d)^4-34/45*b*e^2*n/d^6/(e*x+d)^3-14/5*b*e^2*n/d^7/(e*x+d)^2-131/10
*b*e^2*n/d^8/(e*x+d)-131/10*b*e^2*n*ln(x)/d^9+1/2*(-a-b*ln(c*x^n))/d^7/x^2
+7*e*(a+b*ln(c*x^n))/d^8/x+1/6*e^2*(a+b*ln(c*x^n))/d^3/(e*x+d)^6+3/5*e^2*(
a+b*ln(c*x^n))/d^4/(e*x+d)^5+3/2*e^2*(a+b*ln(c*x^n))/d^5/(e*x+d)^4+10/3*e^
2*(a+b*ln(c*x^n))/d^6/(e*x+d)^3+15/2*e^2*(a+b*ln(c*x^n))/d^7/(e*x+d)^2-21*
e^3*x*(a+b*ln(c*x^n))/d^9/(e*x+d)-28*e^2*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^9+3
41/10*b*e^2*n*ln(e*x+d)/d^9+28*b*e^2*n*polylog(2,-d/e/x)/d^9
```

3.73.2 Mathematica [A] (verified)

Time = 0.33 (sec) , antiderivative size = 486, normalized size of antiderivative = 1.21

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx$$
$$= \frac{-\frac{180ad^2}{x^2}-\frac{90bd^2n}{x^2}+\frac{2520ade}{x}+\frac{2520bden}{x}+\frac{60ad^6e^2}{(d+ex)^6}+\frac{216ad^5e^2}{(d+ex)^5}-\frac{12bd^5e^2n}{(d+ex)^5}+\frac{540ad^4e^2}{(d+ex)^4}-\frac{69bd^4e^2n}{(d+ex)^4}+\frac{1200ad^3e^2}{(d+ex)^3}-\frac{272bd^3}{(d+e}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x)^7),x]
```

output
```
((-180*a*d^2)/x^2 - (90*b*d^2*n)/x^2 + (2520*a*d*e)/x + (2520*b*d*e*n)/x +
 (60*a*d^6*e^2)/(d + e*x)^6 + (216*a*d^5*e^2)/(d + e*x)^5 - (12*b*d^5*e^2*
n)/(d + e*x)^5 + (540*a*d^4*e^2)/(d + e*x)^4 - (69*b*d^4*e^2*n)/(d + e*x)^
4 + (1200*a*d^3*e^2)/(d + e*x)^3 - (272*b*d^3*e^2*n)/(d + e*x)^3 + (2700*a
*d^2*e^2)/(d + e*x)^2 - (1008*b*d^2*e^2*n)/(d + e*x)^2 + (7560*a*d*e^2)/(d
 + e*x) - (4716*b*d*e^2*n)/(d + e*x) - 12276*b*e^2*n*Log[x] + (10080*a*e^2
*Log[c*x^n])/n - (180*b*d^2*Log[c*x^n])/x^2 + (2520*b*d*e*Log[c*x^n])/x +
(60*b*d^6*e^2*Log[c*x^n])/(d + e*x)^6 + (216*b*d^5*e^2*Log[c*x^n])/(d + e*
x)^5 + (540*b*d^4*e^2*Log[c*x^n])/(d + e*x)^4 + (1200*b*d^3*e^2*Log[c*x^n]
)/(d + e*x)^3 + (2700*b*d^2*e^2*Log[c*x^n])/(d + e*x)^2 + (7560*b*d*e^2*Lo
g[c*x^n])/(d + e*x) + (5040*b*e^2*Log[c*x^n]^2)/n + 12276*b*e^2*n*Log[d +
e*x] - 10080*a*e^2*Log[1 + (e*x)/d] - 10080*b*e^2*Log[c*x^n]*Log[1 + (e*x)
/d] - 10080*b*e^2*n*PolyLog[2, -((e*x)/d)])/(360*d^9)
```

3.73.3 Rubi [A] (verified)

Time = 0.86 (sec) , antiderivative size = 401, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx$$
$$\Big\downarrow \text{2793}$$
$$\int \left(-\frac{21e^3(a+b\log(cx^n))}{d^8(d+ex)^2}+\frac{28e^2(a+b\log(cx^n))}{d^8x(d+ex)}-\frac{7e(a+b\log(cx^n))}{d^8x^2}-\frac{15e^3(a+b\log(cx^n))}{d^7(d+ex)^3}+\frac{a+b\log(cx}{d^7x^3}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{21e^3x(a+b\log(cx^n))}{d^9(d+ex)}-\frac{28e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^9}+\frac{7e(a+b\log(cx^n))}{d^8x}+\frac{15e^2(a+b\log(cx^n))}{2d^7(d+ex)^2}-\frac{a+b\log(cx^n)}{2d^7x^2}+\frac{10e^2(a+b\log(cx^n))}{3d^6(d+ex)^3}+\frac{3e^2(a+b\log(cx^n))}{2d^5(d+ex)^4}+\frac{3e^2(a+b\log(cx^n))}{5d^4(d+ex)^5}+\frac{e^2(a+b\log(cx^n))}{6d^3(d+ex)^6}+\frac{28be^2n\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^9}-\frac{131be^2n\log(x)}{10d^9}+\frac{341be^2n\log(d+ex)}{10d^9}-\frac{131be^2n}{10d^8(d+ex)}+\frac{7ben}{d^8x}-\frac{14be^2n}{5d^7(d+ex)^2}-\frac{bn}{4d^7x^2}-\frac{34be^2n}{45d^6(d+ex)^3}-\frac{23be^2n}{120d^5(d+ex)^4}-\frac{be^2n}{30d^4(d+ex)^5}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x)^7),x]
```

output
```
-1/4*(b*n)/(d^7*x^2) + (7*b*e*n)/(d^8*x) - (b*e^2*n)/(30*d^4*(d + e*x)^5)
- (23*b*e^2*n)/(120*d^5*(d + e*x)^4) - (34*b*e^2*n)/(45*d^6*(d + e*x)^3) -
 (14*b*e^2*n)/(5*d^7*(d + e*x)^2) - (131*b*e^2*n)/(10*d^8*(d + e*x)) - (13
1*b*e^2*n*Log[x])/(10*d^9) - (a + b*Log[c*x^n])/(2*d^7*x^2) + (7*e*(a + b*
Log[c*x^n]))/(d^8*x) + (e^2*(a + b*Log[c*x^n]))/(6*d^3*(d + e*x)^6) + (3*e
^2*(a + b*Log[c*x^n]))/(5*d^4*(d + e*x)^5) + (3*e^2*(a + b*Log[c*x^n]))/(2
*d^5*(d + e*x)^4) + (10*e^2*(a + b*Log[c*x^n]))/(3*d^6*(d + e*x)^3) + (15*
e^2*(a + b*Log[c*x^n]))/(2*d^7*(d + e*x)^2) - (21*e^3*x*(a + b*Log[c*x^n])
)/(d^9*(d + e*x)) - (28*e^2*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d^9 + (34
1*b*e^2*n*Log[d + e*x])/(10*d^9) + (28*b*e^2*n*PolyLog[2, -(d/(e*x))])/d^9
```

3.73.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.73.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 3.62 (sec) , antiderivative size = 594, normalized size of antiderivative = 1.48

method	result
risch	$-\frac{28b\ln(x^n)e^2\ln(ex+d)}{d^9}+\frac{21b\ln(x^n)e^2}{d^8(ex+d)}+\frac{15b\ln(x^n)e^2}{2d^7(ex+d)^2}+\frac{10b\ln(x^n)e^2}{3d^6(ex+d)^3}+\frac{3b\ln(x^n)e^2}{2d^5(ex+d)^4}+\frac{3b\ln(x^n)e^2}{5d^4(ex+d)^5}+\frac{b\ln(x^n)e^2}{6d^3(ex+d)^6}-$ b

input
```
int((a+b*ln(c*x^n))/x^3/(e*x+d)^7,x,method=_RETURNVERBOSE)
```

output
```
-28*b*ln(x^n)/d^9*e^2*ln(e*x+d)+21*b*ln(x^n)/d^8*e^2/(e*x+d)+15/2*b*ln(x^n
)/d^7*e^2/(e*x+d)^2+10/3*b*ln(x^n)/d^6/(e*x+d)^3*e^2+3/2*b*ln(x^n)/d^5/(e*
x+d)^4*e^2+3/5*b*ln(x^n)/d^4/(e*x+d)^5*e^2+1/6*b*ln(x^n)/d^3/(e*x+d)^6*e^2
-1/2*b*ln(x^n)/d^7/x^2+28*b*ln(x^n)/d^9*e^2*ln(x)+7*b*ln(x^n)/d^8*e/x-131/
10*b*e^2*n/d^8/(e*x+d)+341/10*b*e^2*n*ln(e*x+d)/d^9-14/5*b*e^2*n/d^7/(e*x+
d)^2-34/45*b*e^2*n/d^6/(e*x+d)^3-23/120*b*e^2*n/d^5/(e*x+d)^4-1/30*b*e^2*n
/d^4/(e*x+d)^5-1/4*b*n/d^7/x^2+7*b*e*n/d^8/x-341/10*b*e^2*n*ln(x)/d^9-14*b
*n/d^9*e^2*ln(x)^2+28*b*n/d^9*e^2*ln(e*x+d)*ln(-e*x/d)+28*b*n/d^9*e^2*dilo
g(-e*x/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn
(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*cs
gn(I*c*x^n)^3+b*ln(c)+a)*(-28/d^9*e^2*ln(e*x+d)+21/d^8*e^2/(e*x+d)+15/2/d^
7*e^2/(e*x+d)^2+10/3/d^6/(e*x+d)^3*e^2+3/2/d^5/(e*x+d)^4*e^2+3/5/d^4/(e*x+
d)^5*e^2+1/6/d^3/(e*x+d)^6*e^2-1/2/d^7/x^2+28/d^9*e^2*ln(x)+7/d^8*e/x)
```

3.73.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx=\int \frac{b\log(cx^n)+a}{(ex+d)^7x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^7,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^7*x^10 + 7*d*e^6*x^9 + 21*d^2*e^5*x^8 + 35*
d^3*e^4*x^7 + 35*d^4*e^3*x^6 + 21*d^5*e^2*x^5 + 7*d^6*e*x^4 + d^7*x^3), x)
```

3.73.6 Sympy [A] (verification not implemented)

Time = 156.80 (sec) , antiderivative size = 1737, normalized size of antiderivative = 4.33

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**7,x)
```

output
```
-a*e**3*Piecewise((x/d**7, Eq(e, 0)), (-1/(6*e*(d + e*x)**6), True))/d**3
- 3*a*e**3*Piecewise((x/d**6, Eq(e, 0)), (-1/(5*e*(d + e*x)**5), True))/d*
*4 - 6*a*e**3*Piecewise((x/d**5, Eq(e, 0)), (-1/(4*e*(d + e*x)**4), True))
/d**5 - 10*a*e**3*Piecewise((x/d**4, Eq(e, 0)), (-1/(3*e*(d + e*x)**3), Tr
ue))/d**6 - 15*a*e**3*Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2)
, True))/d**7 - a/(2*d**7*x**2) - 21*a*e**3*Piecewise((x/d**2, Eq(e, 0)),
(-1/(d*e + e**2*x), True))/d**8 + 7*a*e/(d**8*x) - 28*a*e**3*Piecewise((x/
d, Eq(e, 0)), (log(d + e*x)/e, True))/d**9 + 28*a*e**2*log(x)/d**9 + b*e**
3*n*Piecewise((x/d**7, Eq(e, 0)), (-137*d**4/(360*d**10*e + 1800*d**9*e**2
*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360
*d**5*e**6*x**5) - 385*d**3*e*x/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**
8*e**3*x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x*
*5) - 470*d**2*e**2*x**2/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*
x**2 + 3600*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 2
70*d*e**3*x**3/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 360
0*d**7*e**4*x**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - 60*e**4*x**
4/(360*d**10*e + 1800*d**9*e**2*x + 3600*d**8*e**3*x**2 + 3600*d**7*e**4*x
**3 + 1800*d**6*e**5*x**4 + 360*d**5*e**6*x**5) - log(x)/(6*d**6*e) + log(
d/e + x)/(6*d**6*e), True))/d**3 - b*e**3*Piecewise((x/d**7, Eq(e, 0)), (-
1/(6*e*(d + e*x)**6), True))*log(c*x**n)/d**3 + 3*b*e**3*n*Piecewise((x...
```

3.73.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex)^7}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^7x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^7,x, algorithm="maxima")
```

output
```
1/30*a*((840*e^7*x^7 + 4620*d*e^6*x^6 + 10360*d^2*e^5*x^5 + 11970*d^3*e^4*
x^4 + 7308*d^4*e^3*x^3 + 2058*d^5*e^2*x^2 + 120*d^6*e*x - 15*d^7)/(d^8*e^6
*x^8 + 6*d^9*e^5*x^7 + 15*d^10*e^4*x^6 + 20*d^11*e^3*x^5 + 15*d^12*e^2*x^4
 + 6*d^13*e*x^3 + d^14*x^2) - 840*e^2*log(e*x + d)/d^9 + 840*e^2*log(x)/d^
9) + b*integrate((log(c) + log(x^n))/(e^7*x^10 + 7*d*e^6*x^9 + 21*d^2*e^5*
x^8 + 35*d^3*e^4*x^7 + 35*d^4*e^3*x^6 + 21*d^5*e^2*x^5 + 7*d^6*e*x^4 + d^7
*x^3), x)
```

3.73.8 Giac [F]

$$\int \frac{a + b\log(cx^n)}{x^3(d+ex)^7}\,dx = \int \frac{b\log(cx^n) + a}{(ex+d)^7x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^7,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^7*x^3), x)
```

3.73.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{x^3(d+ex)^7}\,dx = \int \frac{a + b\,\ln(c\,x^n)}{x^3\,(d+e\,x)^7}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^7),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^7), x)
```

3.74 $\int \frac{\log(cx)}{1-cx} dx$

3.74.1 Optimal result

Integrand size = 13, antiderivative size = 12

$$\int \frac{\log(cx)}{1-cx} dx = \frac{\text{PolyLog}(2,1-cx)}{c}$$

output
```
polylog(2,-c*x+1)/c
```

3.74.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\log(cx)}{1-cx} dx = \frac{\text{PolyLog}(2,1-cx)}{c}$$

input
```
Integrate[Log[c*x]/(1 - c*x),x]
```

output
```
PolyLog[2, 1 - c*x]/c
```

3.74.3 Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$, Rules used = {2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log(cx)}{1-cx} \, dx$$

$$\Big\downarrow \; 2752$$

$$\frac{\text{PolyLog}(2,1-cx)}{c}$$

input
```
Int[Log[c*x]/(1 - c*x),x]
```

output
```
PolyLog[2, 1 - c*x]/c
```

3.74.3.1 Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

3.74.4 Maple [A] (verified)

Time = 0.37 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.75

method	result	size
derivativedivides	$\frac{\text{dilog}(xc)}{c}$	9
default	$\frac{\text{dilog}(xc)}{c}$	9
risch	$\frac{\text{dilog}(xc)}{c}$	9
parts	$-\frac{\ln(xc)\ln(xc-1)}{c}+\frac{\text{dilog}(xc)+\ln(xc-1)\ln(xc)}{c}$	37

input
```
int(ln(x*c)/(-c*x+1),x,method=_RETURNVERBOSE)
```

output
```
1/c*dilog(x*c)
```

3.74.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.92

$$\int \frac{\log(cx)}{1-cx}\,dx = \frac{\operatorname{Li}_2(-cx+1)}{c}$$

input
```
integrate(log(c*x)/(-c*x+1),x, algorithm="fricas")
```

output
```
dilog(-c*x + 1)/c
```

3.74.6 Sympy [F]

$$\int \frac{\log(cx)}{1-cx}\,dx = -\int \frac{\log(cx)}{cx-1}\,dx$$

input
```
integrate(ln(c*x)/(-c*x+1),x)
```

output
```
-Integral(log(c*x)/(c*x - 1), x)
```

3.74.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. 2(11) = 22.

Time = 0.21 (sec) , antiderivative size = 48, normalized size of antiderivative = 4.00

$$\int \frac{\log(cx)}{1-cx}\,dx = -\frac{\log(cx-1)\log(cx)}{c} + \frac{\log(cx-1)\log(x)}{c} - \frac{\log(-cx+1)\log(x) + \operatorname{Li}_2(cx)}{c}$$

input
```
integrate(log(c*x)/(-c*x+1),x, algorithm="maxima")
```

output
```
-log(c*x - 1)*log(c*x)/c + log(c*x - 1)*log(x)/c - (log(-c*x + 1)*log(x) +
 dilog(c*x))/c
```

3.74.8 Giac [F]

$$\int \frac{\log(cx)}{1-cx}\,dx = \int -\frac{\log(cx)}{cx-1}\,dx$$

input
```
integrate(log(c*x)/(-c*x+1),x, algorithm="giac")
```

output
```
integrate(-log(c*x)/(c*x - 1), x)
```

3.74.9 Mupad [B] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.67

$$\int \frac{\log(cx)}{1-cx}\,dx = \frac{\mathrm{Li}_2(c\,x)}{c}$$

input
```
int(-log(c*x)/(c*x - 1),x)
```

output
```
dilog(c*x)/c
```

3.75 $\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx$

3.75.1 Optimal result

Integrand size = 14, antiderivative size = 10

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = \text{PolyLog}\left(2,1-\frac{x}{c}\right)$$

output
```
polylog(2,1-x/c)
```

3.75.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 11, normalized size of antiderivative = 1.10

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = \text{PolyLog}\left(2,\frac{c-x}{c}\right)$$

input
```
Integrate[Log[x/c]/(c - x),x]
```

output
```
PolyLog[2, (c - x)/c]
```

3.75.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071, Rules used = {2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx$$

$$\Big\downarrow \text{2752}$$

$$\text{PolyLog}\left(2,1-\frac{x}{c}\right)$$

input
```
Int[Log[x/c]/(c - x),x]
```

output
```
PolyLog[2, 1 - x/c]
```

3.75.3.1 Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

3.75.4 Maple [A] (verified)

Time = 0.38 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.70

method	result	size
derivativedivides	$\operatorname{dilog}\left(\frac{x}{c}\right)$	7
default	$\operatorname{dilog}\left(\frac{x}{c}\right)$	7
risch	$\operatorname{dilog}\left(\frac{x}{c}\right)$	7
parts	$\operatorname{dilog}\left(\frac{x}{c}\right)$	7

input
```
int(ln(x/c)/(c-x),x,method=_RETURNVERBOSE)
```

output
```
dilog(x/c)
```

3.75.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.90

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = \text{Li}_2\left(-\frac{x}{c}+1\right)$$

input
```
integrate(log(x/c)/(c-x),x, algorithm="fricas")
```

output
```
dilog(-x/c + 1)
```

3.75.6 Sympy [F]

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = -\int \frac{\log\left(\frac{x}{c}\right)}{-c+x}\,dx$$

input
```
integrate(ln(x/c)/(c-x),x)
```

output
```
-Integral(log(x/c)/(-c + x), x)
```

3.75.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. 2(9) = 18.

Time = 0.20 (sec) , antiderivative size = 45, normalized size of antiderivative = 4.50

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = \log(c-x)\log(x) - \log(c-x)\log\left(\frac{x}{c}\right) - \log(x)\log\left(-\frac{x}{c}+1\right) - \text{Li}_2\left(\frac{x}{c}\right)$$

input
```
integrate(log(x/c)/(c-x),x, algorithm="maxima")
```

output
```
log(c - x)*log(x) - log(c - x)*log(x/c) - log(x)*log(-x/c + 1) - dilog(x/c
)
```

3.75.8 Giac [F]

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = \int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx$$

input
```
integrate(log(x/c)/(c-x),x, algorithm="giac")
```

output
```
integrate(log(x/c)/(c - x), x)
```

3.75.9 Mupad [B] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 6, normalized size of antiderivative = 0.60

$$\int \frac{\log\left(\frac{x}{c}\right)}{c-x}\,dx = \mathrm{Li}_2\left(\frac{x}{c}\right)$$

input
```
int(log(x/c)/(c - x),x)
```

output
```
dilog(x/c)
```

3.76 $\int x^2(d+ex)\,(a+b\log(cx^n))^2\,dx$

3.76.1 Optimal result

Integrand size = 21, antiderivative size = 109

$$\int x^2(d+ex)\,(a+b\log(cx^n))^2\,dx = \frac{2}{27}b^2dn^2x^3+\frac{1}{32}b^2en^2x^4-\frac{2}{9}bdnx^3(a+b\log(cx^n)) - \frac{1}{8}benx^4(a+b\log(cx^n)) + \frac{1}{3}dx^3(a+b\log(cx^n))^2+\frac{1}{4}ex^4(a+b\log(cx^n))^2$$

output
```
2/27*b^2*d*n^2*x^3+1/32*b^2*e*n^2*x^4-2/9*b*d*n*x^3*(a+b*ln(c*x^n))-1/8*b*
e*n*x^4*(a+b*ln(c*x^n))+1/3*d*x^3*(a+b*ln(c*x^n))^2+1/4*e*x^4*(a+b*ln(c*x^
n))^2
```

3.76.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.75

$$\int x^2(d+ex)\,(a+b\log(cx^n))^2\,dx = \frac{1}{864}x^3\big(27benx(-4a+bn-4b\log(cx^n)) + 64bdn(-3a+bn-3b\log(cx^n)) + 288d(a+b\log(cx^n))^2+216ex(a+b\log(cx^n))^2\big)$$

input
```
Integrate[x^2*(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

output
```
(x^3*(27*b*e*n*x*(-4*a + b*n - 4*b*Log[c*x^n]) + 64*b*d*n*(-3*a + b*n - 3*
b*Log[c*x^n]) + 288*d*(a + b*Log[c*x^n])^2 + 216*e*x*(a + b*Log[c*x^n])^2)
)/864
```

3.76.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(dx^2(a+b\log\left(cx^n\right))^2+ex^3(a+b\log\left(cx^n\right))^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}dx^3(a+b\log\left(cx^n\right))^2-\frac{2}{9}bdnx^3(a+b\log\left(cx^n\right))+\frac{1}{4}ex^4(a+b\log\left(cx^n\right))^2-\frac{1}{8}benx^4(a+b\log\left(cx^n\right))+\frac{2}{27}b^2dn^2x^3+\frac{1}{32}b^2en^2x^4$$

input
```
Int[x^2*(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

output
```
(2*b^2*d*n^2*x^3)/27 + (b^2*e*n^2*x^4)/32 - (2*b*d*n*x^3*(a + b*Log[c*x^n]
))/9 - (b*e*n*x^4*(a + b*Log[c*x^n]))/8 + (d*x^3*(a + b*Log[c*x^n])^2)/3 +
 (e*x^4*(a + b*Log[c*x^n])^2)/4
```

3.76.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.76.4 Maple [A] (verified)

Time = 0.15 (sec) , antiderivative size = 156, normalized size of antiderivative = 1.43

method	result
parallelrisch	$\frac{x^4\ln(c\,x^n)^2 b^2 e}{4}-\frac{\ln(c\,x^n)x^4 b^2 n e}{8}+\frac{b^2 e\,n^2 x^4}{32}+\frac{\ln(c\,x^n)x^4 a b e}{2}-\frac{a b e n\,x^4}{8}+\frac{x^3\ln(c\,x^n)^2 b^2 d}{3}-\frac{2\ln(c\,x^n)x^3 b^2 n d}{9}+$
risch	Expression too large to display

input
```
int(x^2*(e*x+d)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
1/4*x^4*ln(c*x^n)^2*b^2*e-1/8*ln(c*x^n)*x^4*b^2*n*e+1/32*b^2*e*n^2*x^4+1/2
*ln(c*x^n)*x^4*a*b*e-1/8*a*b*e*n*x^4+1/3*x^3*ln(c*x^n)^2*b^2*d-2/9*ln(c*x^
n)*x^3*b^2*n*d+2/27*b^2*d*n^2*x^3+1/4*a^2*e*x^4+2/3*ln(c*x^n)*x^3*a*b*d-2/
9*a*b*d*n*x^3+1/3*a^2*d*x^3
```

3.76.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 219 vs. 2(97) = 194.

Time = 0.31 (sec) , antiderivative size = 219, normalized size of antiderivative = 2.01

$$\begin{aligned}&\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx\\&=\frac{1}{32}\left(b^2en^2-4\,aben+8\,a^2e\right)x^4+\frac{1}{27}\left(2\,b^2dn^2-6\,abdn+9\,a^2d\right)x^3\\&\quad+\frac{1}{12}\left(3\,b^2ex^4+4\,b^2dx^3\right)\log\left(c\right)^2+\frac{1}{12}\left(3\,b^2en^2x^4+4\,b^2dn^2x^3\right)\log\left(x\right)^2\\&\quad-\frac{1}{72}\left(9\left(b^2en-4\,abe\right)x^4+16\left(b^2dn-3\,abd\right)x^3\right)\log\left(c\right)\\&\quad-\frac{1}{72}\left(9\left(b^2en^2-4\,aben\right)x^4+16\left(b^2dn^2-3\,abdn\right)x^3-12\left(3\,b^2enx^4+4\,b^2dnx^3\right)\log\left(c\right)\right)\log\left(x\right)\end{aligned}$$

input
```
integrate(x^2*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
1/32*(b^2*e*n^2 - 4*a*b*e*n + 8*a^2*e)*x^4 + 1/27*(2*b^2*d*n^2 - 6*a*b*d*n
 + 9*a^2*d)*x^3 + 1/12*(3*b^2*e*x^4 + 4*b^2*d*x^3)*log(c)^2 + 1/12*(3*b^2*
e*n^2*x^4 + 4*b^2*d*n^2*x^3)*log(x)^2 - 1/72*(9*(b^2*e*n - 4*a*b*e)*x^4 +
16*(b^2*d*n - 3*a*b*d)*x^3)*log(c) - 1/72*(9*(b^2*e*n^2 - 4*a*b*e*n)*x^4 +
 16*(b^2*d*n^2 - 3*a*b*d*n)*x^3 - 12*(3*b^2*e*n*x^4 + 4*b^2*d*n*x^3)*log(c
))*log(x)
```

3.76.6 Sympy [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 185, normalized size of antiderivative = 1.70

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx=\frac{a^2dx^3}{3}+\frac{a^2ex^4}{4}-\frac{2abdnx^3}{9}+\frac{2abdx^3\log\left(cx^n\right)}{3}-\frac{abenx^4}{8}+\frac{abex^4\log\left(cx^n\right)}{2}+\frac{2b^2dn^2x^3}{27}-\frac{2b^2dnx^3\log\left(cx^n\right)}{9}+\frac{b^2dx^3\log\left(cx^n\right)^2}{3}+\frac{b^2en^2x^4}{32}-\frac{b^2enx^4\log\left(cx^n\right)}{8}+\frac{b^2ex^4\log\left(cx^n\right)^2}{4}$$

input
```
integrate(x**2*(e*x+d)*(a+b*ln(c*x**n))**2,x)
```

output
```
a**2*d*x**3/3 + a**2*e*x**4/4 - 2*a*b*d*n*x**3/9 + 2*a*b*d*x**3*log(c*x**n
)/3 - a*b*e*n*x**4/8 + a*b*e*x**4*log(c*x**n)/2 + 2*b**2*d*n**2*x**3/27 -
2*b**2*d*n*x**3*log(c*x**n)/9 + b**2*d*x**3*log(c*x**n)**2/3 + b**2*e*n**2
*x**4/32 - b**2*e*n*x**4*log(c*x**n)/8 + b**2*e*x**4*log(c*x**n)**2/4
```

3.76.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 151, normalized size of antiderivative = 1.39

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{1}{4}\,b^2ex^4\log\left(cx^n\right)^2 - \frac{1}{8}\,abenx^4 + \frac{1}{2}\,abex^4\log\left(cx^n\right) + \frac{1}{3}\,b^2dx^3\log\left(cx^n\right)^2 - \frac{2}{9}\,abdnx^3 + \frac{1}{4}\,a^2ex^4 + \frac{2}{3}\,abdx^3\log\left(cx^n\right) + \frac{1}{3}\,a^2dx^3 + \frac{2}{27}\left(n^2x^3 - 3\,nx^3\log\left(cx^n\right)\right)b^2d + \frac{1}{32}\left(n^2x^4 - 4\,nx^4\log\left(cx^n\right)\right)b^2e$$

input
```
integrate(x^2*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/4*b^2*e*x^4*log(c*x^n)^2 - 1/8*a*b*e*n*x^4 + 1/2*a*b*e*x^4*log(c*x^n) +
1/3*b^2*d*x^3*log(c*x^n)^2 - 2/9*a*b*d*n*x^3 + 1/4*a^2*e*x^4 + 2/3*a*b*d*x
^3*log(c*x^n) + 1/3*a^2*d*x^3 + 2/27*(n^2*x^3 - 3*n*x^3*log(c*x^n))*b^2*d
+ 1/32*(n^2*x^4 - 4*n*x^4*log(c*x^n))*b^2*e
```

3.76.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 241 vs. 2(97) = 194.

Time = 0.47 (sec) , antiderivative size = 241, normalized size of antiderivative = 2.21

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{1}{4}\,b^2en^2x^4\log\left(x\right)^2 - \frac{1}{8}\,b^2en^2x^4\log\left(x\right) + \frac{1}{2}\,b^2enx^4\log\left(c\right)\log\left(x\right) + \frac{1}{3}\,b^2dn^2x^3\log\left(x\right)^2 + \frac{1}{32}\,b^2en^2x^4 - \frac{1}{8}\,b^2enx^4\log\left(c\right) + \frac{1}{4}\,b^2ex^4\log\left(c\right)^2 - \frac{2}{9}\,b^2dn^2x^3\log\left(x\right) + \frac{1}{2}\,abenx^4\log\left(x\right) + \frac{2}{3}\,b^2dnx^3\log\left(c\right)\log\left(x\right) + \frac{2}{27}\,b^2dn^2x^3 - \frac{1}{8}\,abenx^4 - \frac{2}{9}\,b^2dnx^3\log\left(c\right) + \frac{1}{2}\,abex^4\log\left(c\right) + \frac{1}{3}\,b^2dx^3\log\left(c\right)^2 + \frac{2}{3}\,abdnx^3\log\left(x\right) - \frac{2}{9}\,abdnx^3 + \frac{1}{4}\,a^2ex^4 + \frac{2}{3}\,abdx^3\log\left(c\right) + \frac{1}{3}\,a^2dx^3$$

input
```
integrate(x^2*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/4*b^2*e*n^2*x^4*log(x)^2 - 1/8*b^2*e*n^2*x^4*log(x) + 1/2*b^2*e*n*x^4*lo
g(c)*log(x) + 1/3*b^2*d*n^2*x^3*log(x)^2 + 1/32*b^2*e*n^2*x^4 - 1/8*b^2*e*
n*x^4*log(c) + 1/4*b^2*e*x^4*log(c)^2 - 2/9*b^2*d*n^2*x^3*log(x) + 1/2*a*b
*e*n*x^4*log(x) + 2/3*b^2*d*n*x^3*log(c)*log(x) + 2/27*b^2*d*n^2*x^3 - 1/8
*a*b*e*n*x^4 - 2/9*b^2*d*n*x^3*log(c) + 1/2*a*b*e*x^4*log(c) + 1/3*b^2*d*x
^3*log(c)^2 + 2/3*a*b*d*n*x^3*log(x) - 2/9*a*b*d*n*x^3 + 1/4*a^2*e*x^4 + 2
/3*a*b*d*x^3*log(c) + 1/3*a^2*d*x^3
```

3.76.9 Mupad [B] (verification not implemented)

Time = 0.46 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.06

$$\int x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \ln\left(c\,x^n\right)^2\left(\frac{e\,b^2\,x^4}{4}+\frac{d\,b^2\,x^3}{3}\right) + \ln\left(c\,x^n\right)\left(\frac{b\,e\,(4\,a-b\,n)\,x^4}{8}+\frac{2\,b\,d\,(3\,a-b\,n)\,x^3}{9}\right) + \frac{d\,x^3\,(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2)}{27} + \frac{e\,x^4\,(8\,a^2-4\,a\,b\,n+b^2\,n^2)}{32}$$

input
```
int(x^2*(a + b*log(c*x^n))^2*(d + e*x),x)
```

output
```
log(c*x^n)^2*((b^2*d*x^3)/3 + (b^2*e*x^4)/4) + log(c*x^n)*((2*b*d*x^3*(3*a
 - b*n))/9 + (b*e*x^4*(4*a - b*n))/8) + (d*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*
n))/27 + (e*x^4*(8*a^2 + b^2*n^2 - 4*a*b*n))/32
```

3.77 $\int x(d+ex)(a+b\log(cx^n))^2\,dx$

3.77.1 Optimal result

Integrand size = 19, antiderivative size = 109

$$\int x(d+ex)(a+b\log(cx^n))^2\,dx = \frac{1}{4}b^2dn^2x^2+\frac{2}{27}b^2en^2x^3-\frac{1}{2}bdnx^2(a+b\log(cx^n)) -\frac{2}{9}benx^3(a+b\log(cx^n)) +\frac{1}{2}dx^2(a+b\log(cx^n))^2+\frac{1}{3}ex^3(a+b\log(cx^n))^2$$

output
```
1/4*b^2*d*n^2*x^2+2/27*b^2*e*n^2*x^3-1/2*b*d*n*x^2*(a+b*ln(c*x^n))-2/9*b*e
*n*x^3*(a+b*ln(c*x^n))+1/2*d*x^2*(a+b*ln(c*x^n))^2+1/3*e*x^3*(a+b*ln(c*x^n
))^2
```

3.77.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.75

$$\int x(d+ex)(a+b\log(cx^n))^2\,dx = \frac{1}{108}x^2\left(8benx(-3a+bn-3b\log(cx^n)) +27bdn(-2a+bn-2b\log(cx^n)) +54d(a+b\log(cx^n))^2+36ex(a+b\log(cx^n))^2\right)$$

input
```
Integrate[x*(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

output
```
(x^2*(8*b*e*n*x*(-3*a + b*n - 3*b*Log[c*x^n]) + 27*b*d*n*(-2*a + b*n - 2*b
*Log[c*x^n]) + 54*d*(a + b*Log[c*x^n])^2 + 36*e*x*(a + b*Log[c*x^n])^2))/1
08
```

3.77.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(dx(a+b\log\left(cx^n\right))^2+ex^2(a+b\log\left(cx^n\right))^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}dx^2(a+b\log\left(cx^n\right))^2-\frac{1}{2}bdnx^2(a+b\log\left(cx^n\right))+\frac{1}{3}ex^3(a+b\log\left(cx^n\right))^2-\frac{2}{9}benx^3(a+b\log\left(cx^n\right))+\frac{1}{4}b^2dn^2x^2+\frac{2}{27}b^2en^2x^3$$

input
```
Int[x*(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

output
```
(b^2*d*n^2*x^2)/4 + (2*b^2*e*n^2*x^3)/27 - (b*d*n*x^2*(a + b*Log[c*x^n]))/
2 - (2*b*e*n*x^3*(a + b*Log[c*x^n]))/9 + (d*x^2*(a + b*Log[c*x^n])^2)/2 +
(e*x^3*(a + b*Log[c*x^n])^2)/3
```

3.77.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.77.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.42

method	result
parallelrisch	$\frac{x^3b^2\ln(cx^n)^2e}{3}-\frac{2\ln(cx^n)x^3b^2ne}{9}+\frac{2b^2en^2x^3}{27}+\frac{2x^3ab\ln(cx^n)e}{3}-\frac{2bnx^3ae}{9}+\frac{x^2b^2\ln(cx^n)^2d}{2}-\frac{\ln(cx^n)x^2b^2nd}{2}$
risch	Expression too large to display

input
```
int(x*(e*x+d)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
1/3*x^3*b^2*ln(c*x^n)^2*e-2/9*ln(c*x^n)*x^3*b^2*n*e+2/27*b^2*e*n^2*x^3+2/3
*x^3*a*b*ln(c*x^n)*e-2/9*b*n*x^3*a*e+1/2*x^2*b^2*ln(c*x^n)^2*d-1/2*ln(c*x^
n)*x^2*b^2*n*d+1/4*b^2*d*n^2*x^2+1/3*x^3*a^2*e+x^2*a*b*ln(c*x^n)*d-1/2*b*n
*a*d*x^2+1/2*x^2*a^2*d
```

3.77.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 219 vs. $2(97) = 194$.

Time = 0.27 (sec) , antiderivative size = 219, normalized size of antiderivative = 2.01

$$\begin{aligned}\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx &= \frac{1}{27}\left(2\,b^2en^2-6\,aben+9\,a^2e\right)x^3\\&+\frac{1}{4}\left(b^2dn^2-2\,abdn+2\,a^2d\right)x^2+\frac{1}{6}\left(2\,b^2ex^3+3\,b^2dx^2\right)\log\left(c\right)^2\\&+\frac{1}{6}\left(2\,b^2en^2x^3+3\,b^2dn^2x^2\right)\log\left(x\right)^2-\frac{1}{18}\left(4\left(b^2en-3\,abe\right)x^3+9\left(b^2dn-2\,abd\right)x^2\right)\log\left(c\right)\\&-\frac{1}{18}\left(4\left(b^2en^2-3\,aben\right)x^3+9\left(b^2dn^2-2\,abdn\right)x^2-6\left(2\,b^2enx^3+3\,b^2dnx^2\right)\log\left(c\right)\right)\log\left(x\right)\end{aligned}$$

input
```
integrate(x*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
1/27*(2*b^2*e*n^2 - 6*a*b*e*n + 9*a^2*e)*x^3 + 1/4*(b^2*d*n^2 - 2*a*b*d*n
+ 2*a^2*d)*x^2 + 1/6*(2*b^2*e*x^3 + 3*b^2*d*x^2)*log(c)^2 + 1/6*(2*b^2*e*n
^2*x^3 + 3*b^2*d*n^2*x^2)*log(x)^2 - 1/18*(4*(b^2*e*n - 3*a*b*e)*x^3 + 9*(
b^2*d*n - 2*a*b*d)*x^2)*log(c) - 1/18*(4*(b^2*e*n^2 - 3*a*b*e*n)*x^3 + 9*(
b^2*d*n^2 - 2*a*b*d*n)*x^2 - 6*(2*b^2*e*n*x^3 + 3*b^2*d*n*x^2)*log(c))*log
(x)
```

3.77.6 Sympy [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 184, normalized size of antiderivative = 1.69

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx=\frac{a^2dx^2}{2}+\frac{a^2ex^3}{3}-\frac{abdnx^2}{2}+abdx^2\log\left(cx^n\right)-\frac{2abenx^3}{9}+\frac{2abex^3\log\left(cx^n\right)}{3}+\frac{b^2dn^2x^2}{4}-\frac{b^2dnx^2\log\left(cx^n\right)}{2}+\frac{b^2dx^2\log\left(cx^n\right)^2}{2}+\frac{2b^2en^2x^3}{27}-\frac{2b^2enx^3\log\left(cx^n\right)}{9}+\frac{b^2ex^3\log\left(cx^n\right)^2}{3}$$

input
```
integrate(x*(e*x+d)*(a+b*ln(c*x**n))**2,x)
```

output
```
a**2*d*x**2/2 + a**2*e*x**3/3 - a*b*d*n*x**2/2 + a*b*d*x**2*log(c*x**n) -
2*a*b*e*n*x**3/9 + 2*a*b*e*x**3*log(c*x**n)/3 + b**2*d*n**2*x**2/4 - b**2*
d*n*x**2*log(c*x**n)/2 + b**2*d*x**2*log(c*x**n)**2/2 + 2*b**2*e*n**2*x**3
/27 - 2*b**2*e*n*x**3*log(c*x**n)/9 + b**2*e*x**3*log(c*x**n)**2/3
```

3.77.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.38

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{1}{3}\,b^2ex^3\log\left(cx^n\right)^2 - \frac{2}{9}\,abenx^3 + \frac{2}{3}\,abex^3\log\left(cx^n\right) + \frac{1}{2}\,b^2dx^2\log\left(cx^n\right)^2 - \frac{1}{2}\,abdnx^2 + \frac{1}{3}\,a^2ex^3 + abdx^2\log\left(cx^n\right) + \frac{1}{2}\,a^2dx^2 + \frac{1}{4}\left(n^2x^2 - 2\,nx^2\log\left(cx^n\right)\right)b^2d + \frac{2}{27}\left(n^2x^3 - 3\,nx^3\log\left(cx^n\right)\right)b^2e$$

input
```
integrate(x*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/3*b^2*e*x^3*log(c*x^n)^2 - 2/9*a*b*e*n*x^3 + 2/3*a*b*e*x^3*log(c*x^n) +
1/2*b^2*d*x^2*log(c*x^n)^2 - 1/2*a*b*d*n*x^2 + 1/3*a^2*e*x^3 + a*b*d*x^2*l
og(c*x^n) + 1/2*a^2*d*x^2 + 1/4*(n^2*x^2 - 2*n*x^2*log(c*x^n))*b^2*d + 2/2
7*(n^2*x^3 - 3*n*x^3*log(c*x^n))*b^2*e
```

3.77.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 238 vs. 2(97) = 194.

Time = 0.33 (sec) , antiderivative size = 238, normalized size of antiderivative = 2.18

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{1}{3}\,b^2en^2x^3\log\left(x\right)^2 - \frac{2}{9}\,b^2en^2x^3\log\left(x\right) + \frac{2}{3}\,b^2enx^3\log\left(c\right)\log\left(x\right) + \frac{1}{2}\,b^2dn^2x^2\log\left(x\right)^2 + \frac{2}{27}\,b^2en^2x^3 - \frac{2}{9}\,b^2enx^3\log\left(c\right) + \frac{1}{3}\,b^2ex^3\log\left(c\right)^2 - \frac{1}{2}\,b^2dn^2x^2\log\left(x\right) + \frac{2}{3}\,abenx^3\log\left(x\right) + b^2dnx^2\log\left(c\right)\log\left(x\right) + \frac{1}{4}\,b^2dn^2x^2 - \frac{2}{9}\,abenx^3 - \frac{1}{2}\,b^2dnx^2\log\left(c\right) + \frac{2}{3}\,abex^3\log\left(c\right) + \frac{1}{2}\,b^2dx^2\log\left(c\right)^2 + abdnx^2\log\left(x\right) - \frac{1}{2}\,abdnx^2 + \frac{1}{3}\,a^2ex^3 + abdx^2\log\left(c\right) + \frac{1}{2}\,a^2dx^2$$

input
```
integrate(x*(e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/3*b^2*e*n^2*x^3*log(x)^2 - 2/9*b^2*e*n^2*x^3*log(x) + 2/3*b^2*e*n*x^3*lo
g(c)*log(x) + 1/2*b^2*d*n^2*x^2*log(x)^2 + 2/27*b^2*e*n^2*x^3 - 2/9*b^2*e*
n*x^3*log(c) + 1/3*b^2*e*x^3*log(c)^2 - 1/2*b^2*d*n^2*x^2*log(x) + 2/3*a*b
*e*n*x^3*log(x) + b^2*d*n*x^2*log(c)*log(x) + 1/4*b^2*d*n^2*x^2 - 2/9*a*b*
e*n*x^3 - 1/2*b^2*d*n*x^2*log(c) + 2/3*a*b*e*x^3*log(c) + 1/2*b^2*d*x^2*lo
g(c)^2 + a*b*d*n*x^2*log(x) - 1/2*a*b*d*n*x^2 + 1/3*a^2*e*x^3 + a*b*d*x^2*
log(c) + 1/2*a^2*d*x^2
```

3.77.9 Mupad [B] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.06

$$\int x(d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \ln\left(c\,x^n\right)^2\left(\frac{e\,b^2\,x^3}{3}+\frac{d\,b^2\,x^2}{2}\right) + \ln\left(c\,x^n\right)\left(\frac{2\,b\,e\,(3\,a-b\,n)\,x^3}{9}+\frac{b\,d\,(2\,a-b\,n)\,x^2}{2}\right) + \frac{d\,x^2\,(2\,a^2-2\,a\,b\,n+b^2\,n^2)}{4} + \frac{e\,x^3\,(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2)}{27}$$

input
```
int(x*(a + b*log(c*x^n))^2*(d + e*x),x)
```

output
```
log(c*x^n)^2*((b^2*d*x^2)/2 + (b^2*e*x^3)/3) + log(c*x^n)*((b*d*x^2*(2*a -
 b*n))/2 + (2*b*e*x^3*(3*a - b*n))/9) + (d*x^2*(2*a^2 + b^2*n^2 - 2*a*b*n)
)/4 + (e*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*n))/27
```

3.78 $\int (d+ex)(a+b\log(cx^n))^2\,dx$

3.78.1 Optimal result

Integrand size = 18, antiderivative size = 101

$$\int (d+ex)(a+b\log(cx^n))^2\,dx = -2abdnx+2b^2dn^2x+\frac{1}{4}b^2en^2x^2 - 2b^2dnx\log(cx^n)-\frac{1}{2}benx^2(a+b\log(cx^n)) + dx(a+b\log(cx^n))^2+\frac{1}{2}ex^2(a+b\log(cx^n))^2$$

output
```
-2*a*b*d*n*x+2*b^2*d*n^2*x+1/4*b^2*e*n^2*x^2-2*b^2*d*n*x*ln(c*x^n)-1/2*b*e
*n*x^2*(a+b*ln(c*x^n))+d*x*(a+b*ln(c*x^n))^2+1/2*e*x^2*(a+b*ln(c*x^n))^2
```

3.78.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 77, normalized size of antiderivative = 0.76

$$\int (d+ex)(a+b\log(cx^n))^2\,dx = \frac{1}{4}x\big(benx(-2a+bn-2b\log(cx^n))+4d(a+b\log(cx^n))^2 + 2ex(a+b\log(cx^n))^2-8bdn(a-bn+b\log(cx^n))\big)$$

input
```
Integrate[(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

output
```
(x*(b*e*n*x*(-2*a + b*n - 2*b*Log[c*x^n]) + 4*d*(a + b*Log[c*x^n])^2 + 2*e
*x*(a + b*Log[c*x^n])^2 - 8*b*d*n*(a - b*n + b*Log[c*x^n])))/4
```

3.78.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(d(a+b\log\left(cx^n\right))^2+ex(a+b\log\left(cx^n\right))^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$dx(a+b\log\left(cx^n\right))^2-\frac{1}{2}benx^2(a+b\log\left(cx^n\right))+\frac{1}{2}ex^2(a+b\log\left(cx^n\right))^2-2abdnx-2b^2dnx\log\left(cx^n\right)+2b^2dn^2x+\frac{1}{4}b^2en^2x^2$$

input
```
Int[(d + e*x)*(a + b*Log[c*x^n])^2,x]
```

output
```
-2*a*b*d*n*x + 2*b^2*d*n^2*x + (b^2*e*n^2*x^2)/4 - 2*b^2*d*n*x*Log[c*x^n]
- (b*e*n*x^2*(a + b*Log[c*x^n]))/2 + d*x*(a + b*Log[c*x^n])^2 + (e*x^2*(a
+ b*Log[c*x^n])^2)/2
```

3.78.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

3.78.4 Maple [A] (verified)

Time = 0.18 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.40

method	result
parallelrisch	$\frac{b^2 \ln(c x^n)^2 e x^2}{2} - \frac{\ln(c x^n) x^2 b^2 n e}{2} + \frac{b^2 e n^2 x^2}{4} + ab \ln(c x^n) e x^2 - \frac{bnae x^2}{2} + x b^2 \ln(c x^n)^2 d - 2b^2 dnx \ln$
risch	Expression too large to display

input
```
int((e*x+d)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b^2*ln(c*x^n)^2*e*x^2-1/2*ln(c*x^n)*x^2*b^2*n*e+1/4*b^2*e*n^2*x^2+a*b*
ln(c*x^n)*e*x^2-1/2*b*n*a*e*x^2+x*b^2*ln(c*x^n)^2*d-2*b^2*d*n*x*ln(c*x^n)+
2*b^2*d*n^2*x+1/2*a^2*e*x^2+2*x*a*b*ln(c*x^n)*d-2*a*b*d*n*x+a^2*d*x
```

3.78.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 200 vs. 2(95) = 190.

Time = 0.28 (sec) , antiderivative size = 200, normalized size of antiderivative = 1.98

$$\begin{aligned}\int (d+ex)\,(a+b\log(cx^n))^2\,dx &= \frac{1}{4}\left(b^2en^2-2\,aben+2\,a^2e\right)x^2+\frac{1}{2}\left(b^2ex^2+2\,b^2dx\right)\log(c)^2\\ &\quad+\frac{1}{2}\left(b^2en^2x^2+2\,b^2dn^2x\right)\log(x)^2+\left(2\,b^2dn^2-2\,abdn+a^2d\right)x\\ &\quad-\frac{1}{2}\left(\left(b^2en-2\,abe\right)x^2+4\left(b^2dn-abd\right)x\right)\log(c)\\ &\quad-\frac{1}{2}\left(\left(b^2en^2-2\,aben\right)x^2+4\left(b^2dn^2-abdn\right)x-2\left(b^2enx^2+2\,b^2dnx\right)\log(c)\right)\log(x)\end{aligned}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
1/4*(b^2*e*n^2 - 2*a*b*e*n + 2*a^2*e)*x^2 + 1/2*(b^2*e*x^2 + 2*b^2*d*x)*lo
g(c)^2 + 1/2*(b^2*e*n^2*x^2 + 2*b^2*d*n^2*x)*log(x)^2 + (2*b^2*d*n^2 - 2*a
*b*d*n + a^2*d)*x - 1/2*((b^2*e*n - 2*a*b*e)*x^2 + 4*(b^2*d*n - a*b*d)*x)*
log(c) - 1/2*((b^2*e*n^2 - 2*a*b*e*n)*x^2 + 4*(b^2*d*n^2 - a*b*d*n)*x - 2*
(b^2*e*n*x^2 + 2*b^2*d*n*x)*log(c))*log(x)
```

3.78.6 Sympy [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.61

$$\int (d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = a^2dx + \frac{a^2ex^2}{2} - 2abdnx + 2abdx\log\left(cx^n\right) - \frac{abenx^2}{2} + abex^2\log\left(cx^n\right) + 2b^2dn^2x - 2b^2dnx\log\left(cx^n\right) + b^2dx\log\left(cx^n\right)^2 + \frac{b^2en^2x^2}{4} - \frac{b^2enx^2\log\left(cx^n\right)}{2} + \frac{b^2ex^2\log\left(cx^n\right)^2}{2}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))**2,x)
```

output
```
a**2*d*x + a**2*e*x**2/2 - 2*a*b*d*n*x + 2*a*b*d*x*log(c*x**n) - a*b*e*n*x
**2/2 + a*b*e*x**2*log(c*x**n) + 2*b**2*d*n**2*x - 2*b**2*d*n*x*log(c*x**n
) + b**2*d*x*log(c*x**n)**2 + b**2*e*n**2*x**2/4 - b**2*e*n*x**2*log(c*x**
n)/2 + b**2*e*x**2*log(c*x**n)**2/2
```

3.78.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 136, normalized size of antiderivative = 1.35

$$\int (d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{1}{2}b^2ex^2\log\left(cx^n\right)^2 - \frac{1}{2}abenx^2 + abex^2\log\left(cx^n\right) + b^2dx\log\left(cx^n\right)^2 - 2\,abdnx + \frac{1}{2}a^2ex^2 + 2\,abdx\log\left(cx^n\right) + 2\left(n^2x - nx\log\left(cx^n\right)\right)b^2d + \frac{1}{4}\left(n^2x^2 - 2\,nx^2\log\left(cx^n\right)\right)b^2e + a^2dx$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/2*b^2*e*x^2*log(c*x^n)^2 - 1/2*a*b*e*n*x^2 + a*b*e*x^2*log(c*x^n) + b^2*
d*x*log(c*x^n)^2 - 2*a*b*d*n*x + 1/2*a^2*e*x^2 + 2*a*b*d*x*log(c*x^n) + 2*
(n^2*x - n*x*log(c*x^n))*b^2*d + 1/4*(n^2*x^2 - 2*n*x^2*log(c*x^n))*b^2*e
+ a^2*d*x
```

3.78.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 215 vs. 2(95) = 190.

Time = 0.34 (sec) , antiderivative size = 215, normalized size of antiderivative = 2.13

$$\int (d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{1}{2}\,b^2en^2x^2\log\left(x\right)^2-\frac{1}{2}\,b^2en^2x^2\log\left(x\right)+b^2enx^2\log\left(c\right)\log\left(x\right)+b^2dn^2x\log\left(x\right)^2+\frac{1}{4}\,b^2en^2x^2-\frac{1}{2}\,b^2enx^2\log\left(c\right)+\frac{1}{2}\,b^2ex^2\log\left(c\right)^2-2\,b^2dn^2x\log\left(x\right)+abenx^2\log\left(x\right)+2\,b^2dnx\log\left(c\right)\log\left(x\right)+2\,b^2dn^2x-\frac{1}{2}\,abenx^2-2\,b^2dnx\log\left(c\right)+abex^2\log\left(c\right)+b^2dx\log\left(c\right)^2+2\,abdnx\log\left(x\right)-2\,abdnx+\frac{1}{2}\,a^2ex^2+2\,abdx\log\left(c\right)+a^2dx$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/2*b^2*e*n^2*x^2*log(x)^2 - 1/2*b^2*e*n^2*x^2*log(x) + b^2*e*n*x^2*log(c)
*log(x) + b^2*d*n^2*x*log(x)^2 + 1/4*b^2*e*n^2*x^2 - 1/2*b^2*e*n*x^2*log(c
) + 1/2*b^2*e*x^2*log(c)^2 - 2*b^2*d*n^2*x*log(x) + a*b*e*n*x^2*log(x) + 2
*b^2*d*n*x*log(c)*log(x) + 2*b^2*d*n^2*x - 1/2*a*b*e*n*x^2 - 2*b^2*d*n*x*l
og(c) + a*b*e*x^2*log(c) + b^2*d*x*log(c)^2 + 2*a*b*d*n*x*log(x) - 2*a*b*d
*n*x + 1/2*a^2*e*x^2 + 2*a*b*d*x*log(c) + a^2*d*x
```

3.78.9 Mupad [B] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.03

$$\int (d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx = \ln\left(c\,x^n\right)\,\left(\frac{b\,e\,\left(2\,a-b\,n\right)\,x^2}{2}+2\,b\,d\,\left(a-b\,n\right)\,x\right)+\ln\left(c\,x^n\right)^2\,\left(\frac{e\,b^2\,x^2}{2}+d\,b^2\,x\right)+\frac{e\,x^2\,\left(2\,a^2-2\,a\,b\,n+b^2\,n^2\right)}{4}+d\,x\,\left(a^2-2\,a\,b\,n+2\,b^2\,n^2\right)$$

input
```
int((a + b*log(c*x^n))^2*(d + e*x),x)
```

output
```
log(c*x^n)*((b*e*x^2*(2*a - b*n))/2 + 2*b*d*x*(a - b*n)) + log(c*x^n)^2*((
b^2*e*x^2)/2 + b^2*d*x) + (e*x^2*(2*a^2 + b^2*n^2 - 2*a*b*n))/4 + d*x*(a^2
 + 2*b^2*n^2 - 2*a*b*n)
```

3.78. $\int (d+ex)\left(a+b\log\left(cx^n\right)\right)^2\,dx$

3.79 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}\,dx$

3.79.1 Optimal result

Integrand size = 21, antiderivative size = 70

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}\,dx = -2abenx+2b^2en^2x-2b^2enx\log(cx^n) + ex(a+b\log(cx^n))^2+\frac{d(a+b\log(cx^n))^3}{3bn}$$

output
```
-2*a*b*e*n*x+2*b^2*e*n^2*x-2*b^2*e*n*x*ln(c*x^n)+e*x*(a+b*ln(c*x^n))^2+1/3
*d*(a+b*ln(c*x^n))^3/b/n
```

3.79.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 59, normalized size of antiderivative = 0.84

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}\,dx = ex(a+b\log(cx^n))^2+\frac{d(a+b\log(cx^n))^3}{3bn} - 2benx(a-bn+b\log(cx^n))$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
e*x*(a + b*Log[c*x^n])^2 + (d*(a + b*Log[c*x^n])^3)/(3*b*n) - 2*b*e*n*x*(a
 - b*n + b*Log[c*x^n])
```

3.79.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 63, normalized size of antiderivative = 0.90, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {2788, 2733, 2009, 2739, 15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}dx$$

$$\Big\downarrow \text{2788}$$

$$d\int \frac{(a+b\log(cx^n))^2}{x}dx+e\int (a+b\log(cx^n))^2dx$$

$$\Big\downarrow \text{2733}$$

$$d\int \frac{(a+b\log(cx^n))^2}{x}dx+e\left(x(a+b\log(cx^n))^2-2bn\int (a+b\log(cx^n))dx\right)$$

$$\Big\downarrow \text{2009}$$

$$d\int \frac{(a+b\log(cx^n))^2}{x}dx+e\left(x(a+b\log(cx^n))^2-2bn(ax+bx\log(cx^n)-bnx)\right)$$

$$\Big\downarrow \text{2739}$$

$$\frac{d\int (a+b\log(cx^n))^2d(a+b\log(cx^n))}{bn}+e\left(x(a+b\log(cx^n))^2-2bn(ax+bx\log(cx^n)-bnx)\right)$$

$$\Big\downarrow \text{15}$$

$$\frac{d(a+b\log(cx^n))^3}{3bn}+e\left(x(a+b\log(cx^n))^2-2bn(ax+bx\log(cx^n)-bnx)\right)$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(d*(a + b*Log[c*x^n])^3)/(3*b*n) + e*(x*(a + b*Log[c*x^n])^2 - 2*b*n*(a*x
- b*n*x + b*x*Log[c*x^n]))
```

3.79.3.1 Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2733
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Simp[b*n*p   Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
 FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

rule 2739
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Simp[1/(
b*n)   Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p}
, x]
```

rule 2788
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Simp[d   Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x)
, x], x] + Simp[e   Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

3.79.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.63

method	result
parallelrisch	$\frac{3x\ln(cx^n)^2b^2en-6x\ln(cx^n)b^2en^2+6xb^2en^3+6x\ln(cx^n)aben-6xaben^2+b^2d\ln(cx^n)^3+3\ln(x)a^2dn+3xa^2en+3abd\ln(cx^{\cdots}}{3n}$
risch	Expression too large to display

input
```
int((e*x+d)*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

output
```
1/3*(3*x*ln(c*x^n)^2*b^2*e*n-6*x*ln(c*x^n)*b^2*e*n^2+6*x*b^2*e*n^3+6*x*ln(
c*x^n)*a*b*e*n-6*x*a*b*e*n^2+b^2*d*ln(c*x^n)^3+3*ln(x)*a^2*d*n+3*x*a^2*e*n
+3*a*b*d*ln(c*x^n)^2)/n
```

3.79.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 144 vs. $2(68) = 136$.

Time = 0.28 (sec) , antiderivative size = 144, normalized size of antiderivative = 2.06

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x}\,dx = \frac{1}{3}\,b^2dn^2\log\left(x\right)^3+b^2ex\log\left(c\right)^2-2\left(b^2en-abe\right)x\log\left(c\right) + \left(b^2en^2x+b^2dn\log\left(c\right)+abdn\right)\log\left(x\right)^2+\left(2\,b^2en^2-2\,aben+a^2e\right)x + \left(b^2d\log\left(c\right)^2+a^2d-2\left(b^2en^2-aben\right)x+2\left(b^2enx+abd\right)\log\left(c\right)\right)\log\left(x\right)$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

output
```
1/3*b^2*d*n^2*log(x)^3 + b^2*e*x*log(c)^2 - 2*(b^2*e*n - a*b*e)*x*log(c) +
 (b^2*e*n^2*x + b^2*d*n*log(c) + a*b*d*n)*log(x)^2 + (2*b^2*e*n^2 - 2*a*b*
e*n + a^2*e)*x + (b^2*d*log(c)^2 + a^2*d - 2*(b^2*e*n^2 - a*b*e*n)*x + 2*(
b^2*e*n*x + a*b*d)*log(c))*log(x)
```

3.79.6 Sympy [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 138, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x}\,dx = \begin{cases} \frac{a^2d\log\left(cx^n\right)}{n}+a^2ex+\frac{abd\log\left(cx^n\right)^2}{n}-2abenx+2abex\log\left(cx^n\right)+\frac{b^2d\log\left(cx^n\right)^3}{3n}+2b^2en^2x-2b^2enx\log\left(cx^n\right) \\ \left(a+b\log\left(c\right)\right)^2\left(d\log\left(x\right)+ex\right) \end{cases}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))**2/x,x)
```

output
```
Piecewise((a**2*d*log(c*x**n)/n + a**2*e*x + a*b*d*log(c*x**n)**2/n - 2*a*
b*e*n*x + 2*a*b*e*x*log(c*x**n) + b**2*d*log(c*x**n)**3/(3*n) + 2*b**2*e*n
**2*x - 2*b**2*e*n*x*log(c*x**n) + b**2*e*x*log(c*x**n)**2, Ne(n, 0)), ((a
 + b*log(c))**2*(d*log(x) + e*x), True))
```

3.79.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.44

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}\,dx = b^2ex\log(cx^n)^2 - 2\,abenx + 2\,abex\log(cx^n) + \frac{b^2d\log(cx^n)^3}{3\,n} + 2\left(n^2x - nx\log(cx^n)\right)b^2e + a^2ex + \frac{abd\log(cx^n)^2}{n} + a^2d\log(x)$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

output
```
b^2*e*x*log(c*x^n)^2 - 2*a*b*e*n*x + 2*a*b*e*x*log(c*x^n) + 1/3*b^2*d*log(
c*x^n)^3/n + 2*(n^2*x - n*x*log(c*x^n))*b^2*e + a^2*e*x + a*b*d*log(c*x^n)
^2/n + a^2*d*log(x)
```

3.79.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 144 vs. $2(68) = 136$.

Time = 0.35 (sec) , antiderivative size = 144, normalized size of antiderivative = 2.06

$$\begin{aligned}\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}\,dx &= \frac{1}{3}\,b^2dn^2\log(x)^3 - 2\left(b^2en^2 - b^2en\log(c) - aben\right)x\log(x) \\ &+ \left(b^2en^2x + b^2dn\log(c) + abdn\right)\log(x)^2 \\ &+ \left(2\,b^2en^2 - 2\,b^2en\log(c) + b^2e\log(c)^2 - 2\,aben + 2\,abe\log(c) + a^2e\right)x \\ &+ \left(b^2d\log(c)^2 + 2\,abd\log(c) + a^2d\right)\log(x)\end{aligned}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

output
```
1/3*b^2*d*n^2*log(x)^3 - 2*(b^2*e*n^2 - b^2*e*n*log(c) - a*b*e*n)*x*log(x)
 + (b^2*e*n^2*x + b^2*d*n*log(c) + a*b*d*n)*log(x)^2 + (2*b^2*e*n^2 - 2*b^
2*e*n*log(c) + b^2*e*log(c)^2 - 2*a*b*e*n + 2*a*b*e*log(c) + a^2*e)*x + (b
^2*d*log(c)^2 + 2*a*b*d*log(c) + a^2*d)*log(x)
```

3.79.9 Mupad [B] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 85, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}\,dx = \ln(c\,x^n)^2\left(b^2\,e\,x+\frac{a\,b\,d}{n}\right)+a^2\,d\,\ln(x) + e\,x\,(a^2-2\,a\,b\,n+2\,b^2\,n^2) + \frac{b^2\,d\ln(c\,x^n)^3}{3\,n}+2\,b\,e\,x\,\ln(c\,x^n)\,(a-b\,n)$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x))/x,x)
```

output
```
log(c*x^n)^2*(b^2*e*x + (a*b*d)/n) + a^2*d*log(x) + e*x*(a^2 + 2*b^2*n^2 -
 2*a*b*n) + (b^2*d*log(c*x^n)^3)/(3*n) + 2*b*e*x*log(c*x^n)*(a - b*n)
```

3.80 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^2}\,dx$

3.80.1 Optimal result

Integrand size = 21, antiderivative size = 72

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^2}\,dx = -\frac{2b^2dn^2}{x}-\frac{2bdn(a+b\log(cx^n))}{x}-\frac{d(a+b\log(cx^n))^2}{x}+\frac{e(a+b\log(cx^n))^3}{3bn}$$

output
```
-2*b^2*d*n^2/x-2*b*d*n*(a+b*ln(c*x^n))/x-d*(a+b*ln(c*x^n))^2/x+1/3*e*(a+b*
ln(c*x^n))^3/b/n
```

3.80.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 63, normalized size of antiderivative = 0.88

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^2}\,dx = -\frac{d(a+b\log(cx^n))^2}{x}+\frac{e(a+b\log(cx^n))^3}{3bn}-\frac{2bdn(a+bn+b\log(cx^n))}{x}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x^2,x]
```

output
```
-((d*(a + b*Log[c*x^n])^2)/x) + (e*(a + b*Log[c*x^n])^3)/(3*b*n) - (2*b*d*
n*(a + b*n + b*Log[c*x^n]))/x
```

3.80.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^2} \, dx$$

$$\Big\downarrow \ 2795$$

$$\int \left(\frac{d(a+b\log(cx^n))^2}{x^2}+\frac{e(a+b\log(cx^n))^2}{x}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-\frac{d(a+b\log(cx^n))^2}{x}-\frac{2bdn(a+b\log(cx^n))}{x}+\frac{e(a+b\log(cx^n))^3}{3bn}-\frac{2b^2dn^2}{x}$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x^2,x]
```

output
```
(-2*b^2*d*n^2)/x - (2*b*d*n*(a + b*Log[c*x^n]))/x - (d*(a + b*Log[c*x^n])^
2)/x + (e*(a + b*Log[c*x^n])^3)/(3*b*n)
```

3.80.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.80.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.58

method	result
parallelrisch	$\frac{e\,b^{2} \ln\left(c\,x^{n}\right)^{3} x+3 \ln\left(x\right) x\,a^{2} e n+3 a b e \ln\left(c\,x^{n}\right)^{2} x-3 \ln\left(c\,x^{n}\right)^{2} b^{2} d n-6 \ln\left(c\,x^{n}\right) b^{2} d\,n^{2}-6 b^{2} d\,n^{3}-6 \ln\left(c\,x^{n}\right) a b d n-6 a b d\,n^{2}-3 a^{2} d n}{3 x n}$
risch	Expression too large to display

input
```
int((e*x+d)*(a+b*ln(c*x^n))^2/x^2,x,method=_RETURNVERBOSE)
```

output
```
1/3/x*(e*b^2*ln(c*x^n)^3*x+3*ln(x)*x*a^2*e*n+3*a*b*e*ln(c*x^n)^2*x-3*ln(c*
x^n)^2*b^2*d*n-6*ln(c*x^n)*b^2*d*n^2-6*b^2*d*n^3-6*ln(c*x^n)*a*b*d*n-6*a*b
*d*n^2-3*a^2*d*n)/n
```

3.80.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 149 vs. 2(70) = 140.

Time = 0.28 (sec) , antiderivative size = 149, normalized size of antiderivative = 2.07

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^2}\,dx = \frac{b^2en^2x\log\left(x\right)^3-6\,b^2dn^2-3\,b^2d\log\left(c\right)^2-6\,abdn-3\,a^2d+3\,\left(b^2enx\log\left(c\right)-b^2dn^2+abenx\right)\log\left(x\right)^2-\cdots}{3\,x}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^2,x, algorithm="fricas")
```

output
```
1/3*(b^2*e*n^2*x*log(x)^3 - 6*b^2*d*n^2 - 3*b^2*d*log(c)^2 - 6*a*b*d*n - 3
*a^2*d + 3*(b^2*e*n*x*log(c) - b^2*d*n^2 + a*b*e*n*x)*log(x)^2 - 6*(b^2*d*
n + a*b*d)*log(c) + 3*(b^2*e*x*log(c)^2 - 2*b^2*d*n^2 - 2*a*b*d*n + a^2*e*
x - 2*(b^2*d*n - a*b*e*x)*log(c))*log(x))/x
```

3.80.6 Sympy [A] (verification not implemented)

Time = 1.82 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.96

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^2}\,dx = -\frac{a^2d}{x} + a^2e\log(x) - \frac{2abdn}{x} - \frac{2abd\log(cx^n)}{x} - 2abe\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) - \frac{2b^2dn^2}{x} - \frac{2b^2dn\log(cx^n)}{x} - \frac{b^2d\log(cx^n)^2}{x} - b^2e\left(\begin{cases} -\log(c)^2\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^3}{3n} & \text{otherwise} \end{cases}\right)$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))**2/x**2,x)
```

output
```
-a**2*d/x + a**2*e*log(x) - 2*a*b*d*n/x - 2*a*b*d*log(c*x**n)/x - 2*a*b*e*
Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)) - 2*b
**2*d*n**2/x - 2*b**2*d*n*log(c*x**n)/x - b**2*d*log(c*x**n)**2/x - b**2*e
*Piecewise((-log(c)**2*log(x), Eq(n, 0)), (-log(c*x**n)**3/(3*n), True))
```

3.80.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.58

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^2}\,dx = \frac{b^2e\log(cx^n)^3}{3\,n} - 2\,b^2d\left(\frac{n^2}{x} + \frac{n\log(cx^n)}{x}\right) + \frac{abe\log(cx^n)^2}{n} - \frac{b^2d\log(cx^n)^2}{x} + a^2e\log(x) - \frac{2\,abdn}{x} - \frac{2\,abd\log(cx^n)}{x} - \frac{a^2d}{x}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^2,x, algorithm="maxima")
```

output
```
1/3*b^2*e*log(c*x^n)^3/n - 2*b^2*d*(n^2/x + n*log(c*x^n)/x) + a*b*e*log(c*
x^n)^2/n - b^2*d*log(c*x^n)^2/x + a^2*e*log(x) - 2*a*b*d*n/x - 2*a*b*d*log
(c*x^n)/x - a^2*d/x
```

3.80.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 162 vs. 2(70) = 140.

Time = 0.33 (sec) , antiderivative size = 162, normalized size of antiderivative = 2.25

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^2}\,dx = \frac{1}{3}b^2en^2\log(x)^3 + b^2en\log(c)\log(x)^2 - b^2dn^2\left(\frac{\log(x)^2}{x} + \frac{2\log(x)}{x} + \frac{2}{x}\right) - 2b^2dn\left(\frac{\log(x)}{x} + \frac{1}{x}\right)\log(c) + aben\log(x)^2 + b^2e\log(c)^2\log(|x|) - 2abdn\left(\frac{\log(x)}{x} + \frac{1}{x}\right) + 2abe\log(c)\log(|x|) - \frac{b^2d\log(c)^2}{x} + a^2e\log(|x|) - \frac{2abd\log(c)}{x} - \frac{a^2d}{x}$$

input

```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^2,x, algorithm="giac")
```

output

```
1/3*b^2*e*n^2*log(x)^3 + b^2*e*n*log(c)*log(x)^2 - b^2*d*n^2*(log(x)^2/x +
 2*log(x)/x + 2/x) - 2*b^2*d*n*(log(x)/x + 1/x)*log(c) + a*b*e*n*log(x)^2
+ b^2*e*log(c)^2*log(abs(x)) - 2*a*b*d*n*(log(x)/x + 1/x) + 2*a*b*e*log(c)
*log(abs(x)) - b^2*d*log(c)^2/x + a^2*e*log(abs(x)) - 2*a*b*d*log(c)/x - a
^2*d/x
```

3.80.9 Mupad [B] (verification not implemented)

Time = 0.43 (sec) , antiderivative size = 138, normalized size of antiderivative = 1.92

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^2}\,dx = \ln(x)\,\left(e\,a^2 + 2\,e\,a\,b\,n + 2\,e\,b^2\,n^2\right) - \frac{d\,a^2 + 2\,d\,a\,b\,n + 2\,d\,b^2\,n^2}{x} - \ln(c\,x^n)^2\left(\frac{b^2\,d + b^2\,e\,x}{x} - \frac{b\,e\,(a+b\,n)}{n}\right) - \frac{\ln(c\,x^n)\,\left(2\,b\,d\,(a+b\,n) + 2\,b\,e\,x\,(a+b\,n)\right)}{x} + \frac{b^2\,e\ln(c\,x^n)^3}{3\,n}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x))/x^2,x)
```

output
```
log(x)*(a^2*e + 2*b^2*e*n^2 + 2*a*b*e*n) - (a^2*d + 2*b^2*d*n^2 + 2*a*b*d*
n)/x - log(c*x^n)^2*((b^2*d + b^2*e*x)/x - (b*e*(a + b*n))/n) - (log(c*x^n
)*(2*b*d*(a + b*n) + 2*b*e*x*(a + b*n)))/x + (b^2*e*log(c*x^n)^3)/(3*n)
```

3.80. $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^2} dx$

3.81 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^3}\,dx$

3.81.1 Optimal result

Integrand size = 21, antiderivative size = 103

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\,dx = -\frac{b^2dn^2}{4x^2}-\frac{2b^2en^2}{x}-\frac{bdn(a+b\log\left(cx^n\right))}{2x^2} - \frac{2ben(a+b\log\left(cx^n\right))}{x} - \frac{d(a+b\log\left(cx^n\right))^2}{2x^2}-\frac{e(a+b\log\left(cx^n\right))^2}{x}$$

output
```
-1/4*b^2*d*n^2/x^2-2*b^2*e*n^2/x-1/2*b*d*n*(a+b*ln(c*x^n))/x^2-2*b*e*n*(a+
b*ln(c*x^n))/x-1/2*d*(a+b*ln(c*x^n))^2/x^2-e*(a+b*ln(c*x^n))^2/x
```

3.81.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 90, normalized size of antiderivative = 0.87

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\,dx = -\frac{2a^2(d+2ex)+2abn(d+4ex)+b^2n^2(d+8ex)+2b(2a(d+2ex)+bn(d+4ex))\log\left(cx^n\right)+2b^2(d+2}{4x^2}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x^3,x]
```

output
```
-1/4*(2*a^2*(d + 2*e*x) + 2*a*b*n*(d + 4*e*x) + b^2*n^2*(d + 8*e*x) + 2*b*
(2*a*(d + 2*e*x) + b*n*(d + 4*e*x))*Log[c*x^n] + 2*b^2*(d + 2*e*x)*Log[c*x
^n]^2)/x^2
```

3.81.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^3}\,dx$$

$$\Big\downarrow \ 2795$$

$$\int \left(\frac{d\left(a+b\log\left(cx^n\right)\right)^2}{x^3}+\frac{e\left(a+b\log\left(cx^n\right)\right)^2}{x^2}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-\frac{bdn\left(a+b\log\left(cx^n\right)\right)}{2x^2}-\frac{d\left(a+b\log\left(cx^n\right)\right)^2}{2x^2}-\frac{2ben\left(a+b\log\left(cx^n\right)\right)}{x}-\frac{e\left(a+b\log\left(cx^n\right)\right)^2}{x}-\frac{b^2dn^2}{4x^2}-\frac{2b^2en^2}{x}$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x^3,x]
```

output
```
-1/4*(b^2*d*n^2)/x^2 - (2*b^2*e*n^2)/x - (b*d*n*(a + b*Log[c*x^n]))/(2*x^2
) - (2*b*e*n*(a + b*Log[c*x^n]))/x - (d*(a + b*Log[c*x^n])^2)/(2*x^2) - (e
*(a + b*Log[c*x^n])^2)/x
```

3.81.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.81.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.26

method	result
parallelrisch	$-\frac{4b^2\ln(cx^n)^2ex+8b^2enx\ln(cx^n)+8b^2en^2x+8ab\ln(cx^n)ex+8abenx+2b^2\ln(cx^n)^2d+2\ln(cx^n)b^2nd+b^2dn^2+4a^2ex+4ab\ln}{4x^2}$
risch	Expression too large to display

input
```
int((e*x+d)*(a+b*ln(c*x^n))^2/x^3,x,method=_RETURNVERBOSE)
```

output
```
-1/4/x^2*(4*b^2*ln(c*x^n)^2*e*x+8*b^2*e*n*x*ln(c*x^n)+8*b^2*e*n^2*x+8*a*b*
ln(c*x^n)*e*x+8*a*b*e*n*x+2*b^2*ln(c*x^n)^2*d+2*ln(c*x^n)*b^2*n*d+b^2*d*n^
2+4*a^2*e*x+4*a*b*ln(c*x^n)*d+2*a*b*d*n+2*a^2*d)
```

3.81.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 179, normalized size of antiderivative = 1.74

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^3}\,dx =$$

$$-\frac{b^2dn^2+2\,abdn+2\,a^2d+2\,(2\,b^2ex+b^2d)\log(c)^2+2\,(2\,b^2en^2x+b^2dn^2)\log(x)^2+4\,(2\,b^2en^2+2\,aben}{}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^3,x, algorithm="fricas")
```

output
```
-1/4*(b^2*d*n^2 + 2*a*b*d*n + 2*a^2*d + 2*(2*b^2*e*x + b^2*d)*log(c)^2 + 2
*(2*b^2*e*n^2*x + b^2*d*n^2)*log(x)^2 + 4*(2*b^2*e*n^2 + 2*a*b*e*n + a^2*e
)*x + 2*(b^2*d*n + 2*a*b*d + 4*(b^2*e*n + a*b*e)*x)*log(c) + 2*(b^2*d*n^2
+ 2*a*b*d*n + 4*(b^2*e*n^2 + a*b*e*n)*x + 2*(2*b^2*e*n*x + b^2*d*n)*log(c)
)*log(x))/x^2
```

3.81.6 Sympy [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 165, normalized size of antiderivative = 1.60

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^3}\,dx = -\frac{a^2d}{2x^2} - \frac{a^2e}{x} - \frac{abdn}{2x^2} - \frac{abd\log{(cx^n)}}{x^2} - \frac{2aben}{x} - \frac{2abe\log{(cx^n)}}{x} - \frac{b^2dn^2}{4x^2} - \frac{b^2dn\log{(cx^n)}}{2x^2} - \frac{b^2d\log{(cx^n)}^2}{2x^2} - \frac{2b^2en^2}{x} - \frac{2b^2en\log{(cx^n)}}{x} - \frac{b^2e\log{(cx^n)}^2}{x}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))**2/x**3,x)
```

output
```
-a**2*d/(2*x**2) - a**2*e/x - a*b*d*n/(2*x**2) - a*b*d*log(c*x**n)/x**2 -
2*a*b*e*n/x - 2*a*b*e*log(c*x**n)/x - b**2*d*n**2/(4*x**2) - b**2*d*n*log(
c*x**n)/(2*x**2) - b**2*d*log(c*x**n)**2/(2*x**2) - 2*b**2*e*n**2/x - 2*b*
*2*e*n*log(c*x**n)/x - b**2*e*log(c*x**n)**2/x
```

3.81.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.46

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^3}\,dx = -2\,b^2e\left(\frac{n^2}{x} + \frac{n\log{(cx^n)}}{x}\right) - \frac{1}{4}\,b^2d\left(\frac{n^2}{x^2} + \frac{2\,n\log{(cx^n)}}{x^2}\right) - \frac{b^2e\log{(cx^n)}^2}{x} - \frac{2\,aben}{x} - \frac{2\,abe\log{(cx^n)}}{x} - \frac{b^2d\log{(cx^n)}^2}{2\,x^2} - \frac{abdn}{2\,x^2} - \frac{a^2e}{x} - \frac{abd\log{(cx^n)}}{x^2} - \frac{a^2d}{2\,x^2}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^3,x, algorithm="maxima")
```

output
```
-2*b^2*e*(n^2/x + n*log(c*x^n)/x) - 1/4*b^2*d*(n^2/x^2 + 2*n*log(c*x^n)/x^
2) - b^2*e*log(c*x^n)^2/x - 2*a*b*e*n/x - 2*a*b*e*log(c*x^n)/x - 1/2*b^2*d
*log(c*x^n)^2/x^2 - 1/2*a*b*d*n/x^2 - a^2*e/x - a*b*d*log(c*x^n)/x^2 - 1/2
*a^2*d/x^2
```

3.81.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 192, normalized size of antiderivative = 1.86

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^3}\,dx = -\frac{(2\,b^2en^2x+b^2dn^2)\log{(x)}^2}{2\,x^2} - \frac{(4\,b^2en^2x+4\,b^2enx\log{(c)}+b^2dn^2+4\,abenx+2\,b^2dn\log{(c)}+2\,abdn)\log{(x)}}{2\,x^2} - \frac{8\,b^2en^2x+8\,b^2enx\log{(c)}+4\,b^2ex\log{(c)}^2+b^2dn^2+8\,abenx+2\,b^2dn\log{(c)}+8\,abex\log{(c)}+2\,b^2d\log}{4\,x^2}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^3,x, algorithm="giac")
```

output
```
-1/2*(2*b^2*e*n^2*x + b^2*d*n^2)*log(x)^2/x^2 - 1/2*(4*b^2*e*n^2*x + 4*b^2
*e*n*x*log(c) + b^2*d*n^2 + 4*a*b*e*n*x + 2*b^2*d*n*log(c) + 2*a*b*d*n)*lo
g(x)/x^2 - 1/4*(8*b^2*e*n^2*x + 8*b^2*e*n*x*log(c) + 4*b^2*e*x*log(c)^2 +
b^2*d*n^2 + 8*a*b*e*n*x + 2*b^2*d*n*log(c) + 8*a*b*e*x*log(c) + 2*b^2*d*lo
g(c)^2 + 2*a*b*d*n + 4*a^2*e*x + 4*a*b*d*log(c) + 2*a^2*d)/x^2
```

3.81.9 Mupad [B] (verification not implemented)

Time = 0.50 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^3}\,dx = -\frac{x\,(2\,e\,a^2+4\,e\,a\,b\,n+4\,e\,b^2\,n^2)+a^2\,d+\frac{b^2\,d\,n^2}{2}+a\,b\,d\,n}{2\,x^2} - \frac{\ln{(c\,x^n)}\,\left(\frac{b\,d\,(2\,a+b\,n)}{2}+2\,b\,e\,x\,(a+b\,n)\right)}{x^2} - \frac{\ln{(c\,x^n)}^2\,\left(\frac{b^2\,d}{2}+b^2\,e\,x\right)}{x^2}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x))/x^3,x)
```

output
```
- (x*(2*a^2*e + 4*b^2*e*n^2 + 4*a*b*e*n) + a^2*d + (b^2*d*n^2)/2 + a*b*d*n
)/(2*x^2) - (log(c*x^n)*((b*d*(2*a + b*n))/2 + 2*b*e*x*(a + b*n)))/x^2 - (
log(c*x^n)^2*((b^2*d)/2 + b^2*e*x))/x^2
```

3.81. $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^3}\,dx$

3.82 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^4}\,dx$

3.82.1 Optimal result

Integrand size = 21, antiderivative size = 109

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^4}\,dx = -\frac{2b^2dn^2}{27x^3}-\frac{b^2en^2}{4x^2}-\frac{2bdn(a+b\log\left(cx^n\right))}{9x^3} -\frac{ben(a+b\log\left(cx^n\right))}{2x^2}-\frac{d(a+b\log\left(cx^n\right))^2}{3x^3} -\frac{e(a+b\log\left(cx^n\right))^2}{2x^2}$$

output
```
-2/27*b^2*d*n^2/x^3-1/4*b^2*e*n^2/x^2-2/9*b*d*n*(a+b*ln(c*x^n))/x^3-1/2*b*
e*n*(a+b*ln(c*x^n))/x^2-1/3*d*(a+b*ln(c*x^n))^2/x^3-1/2*e*(a+b*ln(c*x^n))^
2/x^2
```

3.82.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.75

$$\int \frac{(d+ex)\left(a+b\log\left(cx^n\right)\right)^2}{x^4}\,dx = -\frac{36d(a+b\log\left(cx^n\right))^2+54ex(a+b\log\left(cx^n\right))^2+27benx(2a+bn+2b\log\left(cx^n\right))+8bdn(3a+bn+3b\,\mathrm{lo}}{108x^3}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x^4,x]
```

output
```
-1/108*(36*d*(a + b*Log[c*x^n])^2 + 54*e*x*(a + b*Log[c*x^n])^2 + 27*b*e*n
*x*(2*a + b*n + 2*b*Log[c*x^n]) + 8*b*d*n*(3*a + b*n + 3*b*Log[c*x^n]))/x^
3
```

3.82.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^4}dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d(a+b\log(cx^n))^2}{x^4}+\frac{e(a+b\log(cx^n))^2}{x^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2bdn(a+b\log(cx^n))}{9x^3}-\frac{d(a+b\log(cx^n))^2}{3x^3}-\frac{ben(a+b\log(cx^n))}{2x^2}-\frac{e(a+b\log(cx^n))^2}{2x^2}-\frac{2b^2dn^2}{27x^3}-\frac{b^2en^2}{4x^2}$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x^4,x]
```

output
```
(-2*b^2*d*n^2)/(27*x^3) - (b^2*e*n^2)/(4*x^2) - (2*b*d*n*(a + b*Log[c*x^n]
))/(9*x^3) - (b*e*n*(a + b*Log[c*x^n]))/(2*x^2) - (d*(a + b*Log[c*x^n])^2)
/(3*x^3) - (e*(a + b*Log[c*x^n])^2)/(2*x^2)
```

3.82.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.82.4 Maple [A] (verified)

Time = 0.12 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.20

method	result
parallelrisch	$-\frac{54b^2\ln(cx^n)^2ex+54b^2enx\ln(cx^n)+27b^2en^2x+108ab\ln(cx^n)ex+54abenx+36b^2\ln(cx^n)^2d+24\ln(cx^n)b^2nd+8b^2dn^2+54}{108x^3}$
risch	Expression too large to display

input
```
int((e*x+d)*(a+b*ln(c*x^n))^2/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/108/x^3*(54*b^2*ln(c*x^n)^2*e*x+54*b^2*e*n*x*ln(c*x^n)+27*b^2*e*n^2*x+1
08*a*b*ln(c*x^n)*e*x+54*a*b*e*n*x+36*b^2*ln(c*x^n)^2*d+24*ln(c*x^n)*b^2*n*
d+8*b^2*d*n^2+54*a^2*e*x+72*a*b*ln(c*x^n)*d+24*a*b*d*n+36*a^2*d)
```

3.82.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 187, normalized size of antiderivative = 1.72

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^4}\,dx =$$
$$-\frac{8\,b^2dn^2+24\,abdn+36\,a^2d+18\,(3\,b^2ex+2\,b^2d)\log{(c)}^2+18\,(3\,b^2en^2x+2\,b^2dn^2)\log{(x)}^2+27\,(b^2en^2}{}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^4,x, algorithm="fricas")
```

output
```
-1/108*(8*b^2*d*n^2 + 24*a*b*d*n + 36*a^2*d + 18*(3*b^2*e*x + 2*b^2*d)*log
(c)^2 + 18*(3*b^2*e*n^2*x + 2*b^2*d*n^2)*log(x)^2 + 27*(b^2*e*n^2 + 2*a*b*
e*n + 2*a^2*e)*x + 6*(4*b^2*d*n + 12*a*b*d + 9*(b^2*e*n + 2*a*b*e)*x)*log(
c) + 6*(4*b^2*d*n^2 + 12*a*b*d*n + 9*(b^2*e*n^2 + 2*a*b*e*n)*x + 6*(3*b^2*
e*n*x + 2*b^2*d*n)*log(c))*log(x))/x^3
```

3.82.6 Sympy [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 185, normalized size of antiderivative = 1.70

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^4}\,dx = -\frac{a^2d}{3x^3} - \frac{a^2e}{2x^2} - \frac{2abdn}{9x^3} - \frac{2abd\log{(cx^n)}}{3x^3} - \frac{aben}{2x^2} - \frac{abe\log{(cx^n)}}{x^2} - \frac{2b^2dn^2}{27x^3} - \frac{2b^2dn\log{(cx^n)}}{9x^3} - \frac{b^2d\log{(cx^n)}^2}{3x^3} - \frac{b^2en^2}{4x^2} - \frac{b^2en\log{(cx^n)}}{2x^2} - \frac{b^2e\log{(cx^n)}^2}{2x^2}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))**2/x**4,x)
```

output
```
-a**2*d/(3*x**3) - a**2*e/(2*x**2) - 2*a*b*d*n/(9*x**3) - 2*a*b*d*log(c*x*
*n)/(3*x**3) - a*b*e*n/(2*x**2) - a*b*e*log(c*x**n)/x**2 - 2*b**2*d*n**2/(
27*x**3) - 2*b**2*d*n*log(c*x**n)/(9*x**3) - b**2*d*log(c*x**n)**2/(3*x**3
) - b**2*e*n**2/(4*x**2) - b**2*e*n*log(c*x**n)/(2*x**2) - b**2*e*log(c*x*
*n)**2/(2*x**2)
```

3.82.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 151, normalized size of antiderivative = 1.39

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^4}\,dx = -\frac{1}{4}\,b^2e\left(\frac{n^2}{x^2} + \frac{2\,n\log{(cx^n)}}{x^2}\right) - \frac{2}{27}\,b^2d\left(\frac{n^2}{x^3} + \frac{3\,n\log{(cx^n)}}{x^3}\right) - \frac{b^2e\log{(cx^n)}^2}{2\,x^2} - \frac{aben}{2\,x^2} - \frac{abe\log{(cx^n)}}{x^2} - \frac{b^2d\log{(cx^n)}^2}{3\,x^3} - \frac{2\,abdn}{9\,x^3} - \frac{a^2e}{2\,x^2} - \frac{2\,abd\log{(cx^n)}}{3\,x^3} - \frac{a^2d}{3\,x^3}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^4,x, algorithm="maxima")
```

output
```
-1/4*b^2*e*(n^2/x^2 + 2*n*log(c*x^n)/x^2) - 2/27*b^2*d*(n^2/x^3 + 3*n*log(
c*x^n)/x^3) - 1/2*b^2*e*log(c*x^n)^2/x^2 - 1/2*a*b*e*n/x^2 - a*b*e*log(c*x
^n)/x^2 - 1/3*b^2*d*log(c*x^n)^2/x^3 - 2/9*a*b*d*n/x^3 - 1/2*a^2*e/x^2 - 2
/3*a*b*d*log(c*x^n)/x^3 - 1/3*a^2*d/x^3
```

3.82.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 195 vs. $2(97) = 194$.

Time = 0.33 (sec) , antiderivative size = 195, normalized size of antiderivative = 1.79

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^4}\,dx = -\frac{(3\,b^2en^2x+2\,b^2dn^2)\log{(x)}^2}{6\,x^3} - \frac{(9\,b^2en^2x+18\,b^2enx\log{(c)}+4\,b^2dn^2+18\,abenx+12\,b^2dn\log{(c)}+12\,abdn)\log{(x)}}{18\,x^3} - \frac{27\,b^2en^2x+54\,b^2enx\log{(c)}+54\,b^2ex\log{(c)}^2+8\,b^2dn^2+54\,abenx+24\,b^2dn\log{(c)}+108\,abex\log{(c)}}{108\,x^3}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^4,x, algorithm="giac")
```

output
```
-1/6*(3*b^2*e*n^2*x + 2*b^2*d*n^2)*log(x)^2/x^3 - 1/18*(9*b^2*e*n^2*x + 18
*b^2*e*n*x*log(c) + 4*b^2*d*n^2 + 18*a*b*e*n*x + 12*b^2*d*n*log(c) + 12*a*
b*d*n)*log(x)/x^3 - 1/108*(27*b^2*e*n^2*x + 54*b^2*e*n*x*log(c) + 54*b^2*e
*x*log(c)^2 + 8*b^2*d*n^2 + 54*a*b*e*n*x + 24*b^2*d*n*log(c) + 108*a*b*e*x
*log(c) + 36*b^2*d*log(c)^2 + 24*a*b*d*n + 54*a^2*e*x + 72*a*b*d*log(c) +
36*a^2*d)/x^3
```

3.82.9 Mupad [B] (verification not implemented)

Time = 0.52 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^4}\,dx = -\frac{x\left(9\,e\,a^2+9\,e\,a\,b\,n+\frac{9\,e\,b^2\,n^2}{2}\right)+6\,a^2\,d+\frac{4\,b^2\,d\,n^2}{3}+4\,a\,b\,d\,n}{18\,x^3} - \frac{\ln{(c\,x^n)}\,\left(\frac{2\,b\,d\,(3\,a+b\,n)}{3}+\frac{3\,b\,e\,x\,(2\,a+b\,n)}{2}\right)}{3\,x^3} - \frac{\ln{(c\,x^n)}^2\,\left(\frac{b^2\,d}{3}+\frac{b^2\,e\,x}{2}\right)}{x^3}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x))/x^4,x)
```

output
```
- (x*(9*a^2*e + (9*b^2*e*n^2)/2 + 9*a*b*e*n) + 6*a^2*d + (4*b^2*d*n^2)/3 +
 4*a*b*d*n)/(18*x^3) - (log(c*x^n)*((2*b*d*(3*a + b*n))/3 + (3*b*e*x*(2*a
+ b*n))/2))/(3*x^3) - (log(c*x^n)^2*((b^2*d)/3 + (b^2*e*x)/2))/x^3
```

3.82. $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^4}\,dx$

3.83 $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^5} dx$

3.83.1 Optimal result

Integrand size = 21, antiderivative size = 109

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^5} dx = -\frac{b^2dn^2}{32x^4} - \frac{2b^2en^2}{27x^3} - \frac{bdn(a+b\log(cx^n))}{8x^4} - \frac{2ben(a+b\log(cx^n))}{9x^3} - \frac{d(a+b\log(cx^n))^2}{4x^4} - \frac{e(a+b\log(cx^n))^2}{3x^3}$$

output
```
-1/32*b^2*d*n^2/x^4-2/27*b^2*e*n^2/x^3-1/8*b*d*n*(a+b*ln(c*x^n))/x^4-2/9*b
*e*n*(a+b*ln(c*x^n))/x^3-1/4*d*(a+b*ln(c*x^n))^2/x^4-1/3*e*(a+b*ln(c*x^n))
^2/x^3
```

3.83.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.75

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^5} dx = -\frac{216d(a+b\log(cx^n))^2 + 288ex(a+b\log(cx^n))^2 + 64benx(3a+bn+3b\log(cx^n)) + 27bdn(4a+bn+}{864x^4}$$

input
```
Integrate[((d + e*x)*(a + b*Log[c*x^n])^2)/x^5,x]
```

output
```
-1/864*(216*d*(a + b*Log[c*x^n])^2 + 288*e*x*(a + b*Log[c*x^n])^2 + 64*b*e
*n*x*(3*a + b*n + 3*b*Log[c*x^n]) + 27*b*d*n*(4*a + b*n + 4*b*Log[c*x^n]))
/x^4
```

3.83.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^5}dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d(a+b\log(cx^n))^2}{x^5}+\frac{e(a+b\log(cx^n))^2}{x^4}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{bdn(a+b\log(cx^n))}{8x^4}-\frac{d(a+b\log(cx^n))^2}{4x^4}-\frac{2ben(a+b\log(cx^n))}{9x^3}-\frac{e(a+b\log(cx^n))^2}{3x^3}-\frac{b^2dn^2}{32x^4}-\frac{2b^2en^2}{27x^3}$$

input
```
Int[((d + e*x)*(a + b*Log[c*x^n])^2)/x^5,x]
```

output
```
-1/32*(b^2*d*n^2)/x^4 - (2*b^2*e*n^2)/(27*x^3) - (b*d*n*(a + b*Log[c*x^n])
)/(8*x^4) - (2*b*e*n*(a + b*Log[c*x^n]))/(9*x^3) - (d*(a + b*Log[c*x^n])^2
)/(4*x^4) - (e*(a + b*Log[c*x^n])^2)/(3*x^3)
```

3.83.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.83.4 Maple [A] (verified)

Time = 0.14 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.20

method	result
parallelrisch	$-\frac{288b^2\ln(cx^n)^2ex+192b^2enx\ln(cx^n)+64b^2en^2x+576ab\ln(cx^n)ex+192abenx+216b^2\ln(cx^n)^2d+108\ln(cx^n)b^2nd+27b^2d}{864x^4}$
risch	Expression too large to display

input
```
int((e*x+d)*(a+b*ln(c*x^n))^2/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/864/x^4*(288*b^2*ln(c*x^n)^2*e*x+192*b^2*e*n*x*ln(c*x^n)+64*b^2*e*n^2*x
+576*a*b*ln(c*x^n)*e*x+192*a*b*e*n*x+216*b^2*ln(c*x^n)^2*d+108*ln(c*x^n)*b
^2*n*d+27*b^2*d*n^2+288*a^2*e*x+432*a*b*ln(c*x^n)*d+108*a*b*d*n+216*a^2*d)
```

3.83.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 188, normalized size of antiderivative = 1.72

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^5}\,dx =$$
$$-\frac{27\,b^2dn^2+108\,abdn+216\,a^2d+72\,(4\,b^2ex+3\,b^2d)\log(c)^2+72\,(4\,b^2en^2x+3\,b^2dn^2)\log(x)^2+32\,(2\,b^2}{}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^5,x, algorithm="fricas")
```

output
```
-1/864*(27*b^2*d*n^2 + 108*a*b*d*n + 216*a^2*d + 72*(4*b^2*e*x + 3*b^2*d)*
log(c)^2 + 72*(4*b^2*e*n^2*x + 3*b^2*d*n^2)*log(x)^2 + 32*(2*b^2*e*n^2 + 6
*a*b*e*n + 9*a^2*e)*x + 12*(9*b^2*d*n + 36*a*b*d + 16*(b^2*e*n + 3*a*b*e)*
x)*log(c) + 12*(9*b^2*d*n^2 + 36*a*b*d*n + 16*(b^2*e*n^2 + 3*a*b*e*n)*x +
12*(4*b^2*e*n*x + 3*b^2*d*n)*log(c))*log(x))/x^4
```

3.83.6 Sympy [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 187, normalized size of antiderivative = 1.72

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^5}\,dx = -\frac{a^2d}{4x^4} - \frac{a^2e}{3x^3} - \frac{abdn}{8x^4} - \frac{abd\log(cx^n)}{2x^4} - \frac{2aben}{9x^3} - \frac{2abe\log(cx^n)}{3x^3} - \frac{b^2dn^2}{32x^4} - \frac{b^2dn\log(cx^n)}{8x^4} - \frac{b^2d\log(cx^n)^2}{4x^4} - \frac{2b^2en^2}{27x^3} - \frac{2b^2en\log(cx^n)}{9x^3} - \frac{b^2e\log(cx^n)^2}{3x^3}$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))**2/x**5,x)
```

output
```
-a**2*d/(4*x**4) - a**2*e/(3*x**3) - a*b*d*n/(8*x**4) - a*b*d*log(c*x**n)/
(2*x**4) - 2*a*b*e*n/(9*x**3) - 2*a*b*e*log(c*x**n)/(3*x**3) - b**2*d*n**2
/(32*x**4) - b**2*d*n*log(c*x**n)/(8*x**4) - b**2*d*log(c*x**n)**2/(4*x**4
) - 2*b**2*e*n**2/(27*x**3) - 2*b**2*e*n*log(c*x**n)/(9*x**3) - b**2*e*log
(c*x**n)**2/(3*x**3)
```

3.83.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 151, normalized size of antiderivative = 1.39

$$\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^5}\,dx = -\frac{2}{27}b^2e\left(\frac{n^2}{x^3} + \frac{3\,n\log(cx^n)}{x^3}\right) - \frac{1}{32}b^2d\left(\frac{n^2}{x^4} + \frac{4\,n\log(cx^n)}{x^4}\right) - \frac{b^2e\log(cx^n)^2}{3\,x^3} - \frac{2\,aben}{9\,x^3} - \frac{2\,abe\log(cx^n)}{3\,x^3} - \frac{b^2d\log(cx^n)^2}{4\,x^4} - \frac{abdn}{8\,x^4} - \frac{a^2e}{3\,x^3} - \frac{abd\log(cx^n)}{2\,x^4} - \frac{a^2d}{4\,x^4}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^5,x, algorithm="maxima")
```

output
```
-2/27*b^2*e*(n^2/x^3 + 3*n*log(c*x^n)/x^3) - 1/32*b^2*d*(n^2/x^4 + 4*n*log
(c*x^n)/x^4) - 1/3*b^2*e*log(c*x^n)^2/x^3 - 2/9*a*b*e*n/x^3 - 2/3*a*b*e*lo
g(c*x^n)/x^3 - 1/4*b^2*d*log(c*x^n)^2/x^4 - 1/8*a*b*d*n/x^4 - 1/3*a^2*e/x^
3 - 1/2*a*b*d*log(c*x^n)/x^4 - 1/4*a^2*d/x^4
```

3.83.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 195 vs. $2(97) = 194$.

Time = 0.44 (sec) , antiderivative size = 195, normalized size of antiderivative = 1.79

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^5}\,dx = -\frac{(4\,b^2en^2x+3\,b^2dn^2)\log{(x)}^2}{12\,x^4} - \frac{(16\,b^2en^2x+48\,b^2enx\log{(c)}+9\,b^2dn^2+48\,abenx+36\,b^2dn\log{(c)}+36\,abdn)\log{(x)}}{72\,x^4} - \frac{64\,b^2en^2x+192\,b^2enx\log{(c)}+288\,b^2ex\log{(c)}^2+27\,b^2dn^2+192\,abenx+108\,b^2dn\log{(c)}+576\,abex\,l}{864\,x^4}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^2/x^5,x, algorithm="giac")
```

output
```
-1/12*(4*b^2*e*n^2*x + 3*b^2*d*n^2)*log(x)^2/x^4 - 1/72*(16*b^2*e*n^2*x +
48*b^2*e*n*x*log(c) + 9*b^2*d*n^2 + 48*a*b*e*n*x + 36*b^2*d*n*log(c) + 36*
a*b*d*n)*log(x)/x^4 - 1/864*(64*b^2*e*n^2*x + 192*b^2*e*n*x*log(c) + 288*b
^2*e*x*log(c)^2 + 27*b^2*d*n^2 + 192*a*b*e*n*x + 108*b^2*d*n*log(c) + 576*
a*b*e*x*log(c) + 216*b^2*d*log(c)^2 + 108*a*b*d*n + 288*a^2*e*x + 432*a*b*
d*log(c) + 216*a^2*d)/x^4
```

3.83.9 Mupad [B] (verification not implemented)

Time = 0.52 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex)\,(a+b\log{(cx^n)})^2}{x^5}\,dx = -\frac{x\left(24\,e\,a^2+16\,e\,a\,b\,n+\frac{16\,e\,b^2\,n^2}{3}\right)+18\,a^2\,d+\frac{9\,b^2\,d\,n^2}{4}+9\,a\,b\,d\,n}{72\,x^4} - \frac{\ln{(c\,x^n)}\left(\frac{3\,b\,d\,(4\,a+b\,n)}{4}+\frac{4\,b\,e\,x\,(3\,a+b\,n)}{3}\right)}{6\,x^4} - \frac{\ln{(c\,x^n)}^2\left(\frac{b^2\,d}{4}+\frac{b^2\,e\,x}{3}\right)}{x^4}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x))/x^5,x)
```

output
```
- (x*(24*a^2*e + (16*b^2*e*n^2)/3 + 16*a*b*e*n) + 18*a^2*d + (9*b^2*d*n^2)
/4 + 9*a*b*d*n)/(72*x^4) - (log(c*x^n)*((3*b*d*(4*a + b*n))/4 + (4*b*e*x*(
3*a + b*n))/3))/(6*x^4) - (log(c*x^n)^2*((b^2*d)/4 + (b^2*e*x)/3))/x^4
```

3.83. $\int \frac{(d+ex)(a+b\log(cx^n))^2}{x^5}\,dx$

3.84 $\int x^2(d+ex)^2 (a+b\log(cx^n))^2 \, dx$

3.84.1 Optimal result

Integrand size = 23, antiderivative size = 178

$$\begin{aligned}\int x^2(d+ex)^2 (a+b\log(cx^n))^2 \, dx = {} & \frac{2}{27}b^2d^2n^2x^3 + \frac{1}{16}b^2den^2x^4 + \frac{2}{125}b^2e^2n^2x^5 \\ & - \frac{2}{9}bd^2nx^3(a+b\log(cx^n)) - \frac{1}{4}bdenx^4(a+b\log(cx^n)) \\ & - \frac{2}{25}be^2nx^5(a+b\log(cx^n)) + \frac{1}{3}d^2x^3(a+b\log(cx^n))^2 \\ & + \frac{1}{2}dex^4(a+b\log(cx^n))^2 + \frac{1}{5}e^2x^5(a+b\log(cx^n))^2\end{aligned}$$

output
```
2/27*b^2*d^2*n^2*x^3+1/16*b^2*d*e*n^2*x^4+2/125*b^2*e^2*n^2*x^5-2/9*b*d^2*
n*x^3*(a+b*ln(c*x^n))-1/4*b*d*e*n*x^4*(a+b*ln(c*x^n))-2/25*b*e^2*n*x^5*(a+
b*ln(c*x^n))+1/3*d^2*x^3*(a+b*ln(c*x^n))^2+1/2*d*e*x^4*(a+b*ln(c*x^n))^2+1
/5*e^2*x^5*(a+b*ln(c*x^n))^2
```

3.84.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 149, normalized size of antiderivative = 0.84

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx=\frac{2}{125}be^2nx^5(-5a+bn-5b\log\left(cx^n\right))+\frac{1}{16}bdenx^4(-4a+bn-4b\log\left(cx^n\right))+\frac{2}{27}bd^2nx^3(-3a+bn-3b\log\left(cx^n\right))+\frac{1}{3}d^2x^3(a+b\log\left(cx^n\right))^2+\frac{1}{2}dex^4(a+b\log\left(cx^n\right))^2+\frac{1}{5}e^2x^5(a+b\log\left(cx^n\right))^2$$

input
```
Integrate[x^2*(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
(2*b*e^2*n*x^5*(-5*a + b*n - 5*b*Log[c*x^n]))/125 + (b*d*e*n*x^4*(-4*a + b
*n - 4*b*Log[c*x^n]))/16 + (2*b*d^2*n*x^3*(-3*a + b*n - 3*b*Log[c*x^n]))/2
7 + (d^2*x^3*(a + b*Log[c*x^n])^2)/3 + (d*e*x^4*(a + b*Log[c*x^n])^2)/2 +
(e^2*x^5*(a + b*Log[c*x^n])^2)/5
```

3.84.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 178, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx$$

$$\Big\downarrow \text{ 2795}$$

$$\int \left(d^2x^2(a+b\log\left(cx^n\right))^2+2dex^3(a+b\log\left(cx^n\right))^2+e^2x^4(a+b\log\left(cx^n\right))^2\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{3}d^2x^3(a+b\log(cx^n))^2 - \frac{2}{9}bd^2nx^3(a+b\log(cx^n)) + \frac{1}{2}dex^4(a+b\log(cx^n))^2 - \frac{1}{4}bdenx^4(a+b\log(cx^n)) + \frac{1}{5}e^2x^5(a+b\log(cx^n))^2 - \frac{2}{25}be^2nx^5(a+b\log(cx^n)) + \frac{2}{27}b^2d^2n^2x^3 + \frac{1}{16}b^2den^2x^4 + \frac{2}{125}b^2e^2n^2x^5$$

input
```
Int[x^2*(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
(2*b^2*d^2*n^2*x^3)/27 + (b^2*d*e*n^2*x^4)/16 + (2*b^2*e^2*n^2*x^5)/125 -
(2*b*d^2*n*x^3*(a + b*Log[c*x^n]))/9 - (b*d*e*n*x^4*(a + b*Log[c*x^n]))/4
- (2*b*e^2*n*x^5*(a + b*Log[c*x^n]))/25 + (d^2*x^3*(a + b*Log[c*x^n])^2)/3
 + (d*e*x^4*(a + b*Log[c*x^n])^2)/2 + (e^2*x^5*(a + b*Log[c*x^n])^2)/5
```

3.84.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.84.4 Maple [A] (verified)

Time = 4.70 (sec) , antiderivative size = 262, normalized size of antiderivative = 1.47

method	result
parallelrisch	$\frac{x^5\ln(cx^n)^2b^2e^2}{5} - \frac{2\ln(cx^n)x^5ne^2b^2}{25} + \frac{2b^2e^2n^2x^5}{125} + \frac{2\ln(cx^n)x^5ae^2b}{5} - \frac{2abe^2nx^5}{25} + \frac{x^4\ln(cx^n)^2b^2de}{2} - \ln(cx^n)$
risch	Expression too large to display

input
```
int(x^2*(e*x+d)^2*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
1/5*x^5*ln(c*x^n)^2*b^2*e^2-2/25*ln(c*x^n)*x^5*n*e^2*b^2+2/125*b^2*e^2*n^2
*x^5+2/5*ln(c*x^n)*x^5*a*e^2*b-2/25*a*b*e^2*n*x^5+1/2*x^4*ln(c*x^n)^2*b^2*
d*e-1/4*ln(c*x^n)*x^4*n*d*e*b^2+1/16*b^2*d*e*n^2*x^4+1/5*a^2*e^2*x^5+ln(c*
x^n)*x^4*a*d*e*b-1/4*a*b*d*e*n*x^4+1/3*x^3*ln(c*x^n)^2*b^2*d^2-2/9*ln(c*x^
n)*x^3*n*b^2*d^2+2/27*b^2*d^2*n^2*x^3+1/2*a^2*d*e*x^4+2/3*ln(c*x^n)*x^3*a*
b*d^2-2/9*a*b*d^2*n*x^3+1/3*a^2*d^2*x^3
```

3.84.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 364 vs. $2(160) = 320$.

Time = 0.27 (sec) , antiderivative size = 364, normalized size of antiderivative = 2.04

$$\int x^2(d+ex)^2\,(a+b\log{(cx^n)})^2\,dx$$
$$= \frac{1}{125}\left(2\,b^2e^2n^2 - 10\,abe^2n + 25\,a^2e^2\right)x^5 + \frac{1}{16}\left(b^2den^2 - 4\,abden + 8\,a^2de\right)x^4$$
$$+ \frac{1}{27}\left(2\,b^2d^2n^2 - 6\,abd^2n + 9\,a^2d^2\right)x^3 + \frac{1}{30}\left(6\,b^2e^2x^5 + 15\,b^2dex^4 + 10\,b^2d^2x^3\right)\log{(c)}^2$$
$$+ \frac{1}{30}\left(6\,b^2e^2n^2x^5 + 15\,b^2den^2x^4 + 10\,b^2d^2n^2x^3\right)\log{(x)}^2$$
$$- \frac{1}{900}\left(72\,\left(b^2e^2n - 5\,abe^2\right)x^5 + 225\,\left(b^2den - 4\,abde\right)x^4 + 200\,\left(b^2d^2n - 3\,abd^2\right)x^3\right)\log{(c)}$$
$$- \frac{1}{900}\left(72\,\left(b^2e^2n^2 - 5\,abe^2n\right)x^5 + 225\,\left(b^2den^2 - 4\,abden\right)x^4 + 200\,\left(b^2d^2n^2 - 3\,abd^2n\right)x^3 - 60\,(6\,b^2e^2nx^5\right.$$

input
```
integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
1/125*(2*b^2*e^2*n^2 - 10*a*b*e^2*n + 25*a^2*e^2)*x^5 + 1/16*(b^2*d*e*n^2
- 4*a*b*d*e*n + 8*a^2*d*e)*x^4 + 1/27*(2*b^2*d^2*n^2 - 6*a*b*d^2*n + 9*a^2
*d^2)*x^3 + 1/30*(6*b^2*e^2*x^5 + 15*b^2*d*e*x^4 + 10*b^2*d^2*x^3)*log(c)^
2 + 1/30*(6*b^2*e^2*n^2*x^5 + 15*b^2*d*e*n^2*x^4 + 10*b^2*d^2*n^2*x^3)*log
(x)^2 - 1/900*(72*(b^2*e^2*n - 5*a*b*e^2)*x^5 + 225*(b^2*d*e*n - 4*a*b*d*e
)*x^4 + 200*(b^2*d^2*n - 3*a*b*d^2)*x^3)*log(c) - 1/900*(72*(b^2*e^2*n^2 -
 5*a*b*e^2*n)*x^5 + 225*(b^2*d*e*n^2 - 4*a*b*d*e*n)*x^4 + 200*(b^2*d^2*n^2
 - 3*a*b*d^2*n)*x^3 - 60*(6*b^2*e^2*n*x^5 + 15*b^2*d*e*n*x^4 + 10*b^2*d^2*
n*x^3)*log(c))*log(x)
```

3.84.6 Sympy [A] (verification not implemented)

Time = 0.47 (sec) , antiderivative size = 311, normalized size of antiderivative = 1.75

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx=\frac{a^2d^2x^3}{3}+\frac{a^2dex^4}{2}+\frac{a^2e^2x^5}{5}-\frac{2abd^2nx^3}{9}+\frac{2abd^2x^3\log\left(cx^n\right)}{3}-\frac{abdenx^4}{4}+abdex^4\log\left(cx^n\right)-\frac{2abe^2nx^5}{25}+\frac{2abe^2x^5\log\left(cx^n\right)}{5}+\frac{2b^2d^2n^2x^3}{27}-\frac{2b^2d^2nx^3\log\left(cx^n\right)}{9}+\frac{b^2d^2x^3\log\left(cx^n\right)^2}{3}+\frac{b^2den^2x^4}{16}-\frac{b^2denx^4\log\left(cx^n\right)}{4}+\frac{b^2dex^4\log\left(cx^n\right)^2}{2}+\frac{2b^2e^2n^2x^5}{125}-\frac{2b^2e^2nx^5\log\left(cx^n\right)}{25}+\frac{b^2e^2x^5\log\left(cx^n\right)^2}{5}$$

input
```
integrate(x**2*(e*x+d)**2*(a+b*ln(c*x**n))**2,x)
```

output
```
a**2*d**2*x**3/3 + a**2*d*e*x**4/2 + a**2*e**2*x**5/5 - 2*a*b*d**2*n*x**3/
9 + 2*a*b*d**2*x**3*log(c*x**n)/3 - a*b*d*e*n*x**4/4 + a*b*d*e*x**4*log(c*
x**n) - 2*a*b*e**2*n*x**5/25 + 2*a*b*e**2*x**5*log(c*x**n)/5 + 2*b**2*d**2
*n**2*x**3/27 - 2*b**2*d**2*n*x**3*log(c*x**n)/9 + b**2*d**2*x**3*log(c*x*
*n)**2/3 + b**2*d*e*n**2*x**4/16 - b**2*d*e*n*x**4*log(c*x**n)/4 + b**2*d*
e*x**4*log(c*x**n)**2/2 + 2*b**2*e**2*n**2*x**5/125 - 2*b**2*e**2*n*x**5*l
og(c*x**n)/25 + b**2*e**2*x**5*log(c*x**n)**2/5
```

3.84.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 250, normalized size of antiderivative = 1.40

$$\int x^2(d+ex)^2(a+b\log(cx^n))^2\,dx = \frac{1}{5}b^2e^2x^5\log(cx^n)^2 - \frac{2}{25}abe^2nx^5 + \frac{2}{5}abe^2x^5\log(cx^n) + \frac{1}{2}b^2dex^4\log(cx^n)^2 - \frac{1}{4}abdenx^4 + \frac{1}{5}a^2e^2x^5 + abdex^4\log(cx^n) + \frac{1}{3}b^2d^2x^3\log(cx^n)^2 - \frac{2}{9}abd^2nx^3 + \frac{1}{2}a^2dex^4 + \frac{2}{3}abd^2x^3\log(cx^n) + \frac{1}{3}a^2d^2x^3 + \frac{2}{27}\left(n^2x^3 - 3\,nx^3\log(cx^n)\right)b^2d^2 + \frac{1}{16}\left(n^2x^4 - 4\,nx^4\log(cx^n)\right)b^2de + \frac{2}{125}\left(n^2x^5 - 5\,nx^5\log(cx^n)\right)b^2e^2$$

input
```
integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/5*b^2*e^2*x^5*log(c*x^n)^2 - 2/25*a*b*e^2*n*x^5 + 2/5*a*b*e^2*x^5*log(c*
x^n) + 1/2*b^2*d*e*x^4*log(c*x^n)^2 - 1/4*a*b*d*e*n*x^4 + 1/5*a^2*e^2*x^5
+ a*b*d*e*x^4*log(c*x^n) + 1/3*b^2*d^2*x^3*log(c*x^n)^2 - 2/9*a*b*d^2*n*x^
3 + 1/2*a^2*d*e*x^4 + 2/3*a*b*d^2*x^3*log(c*x^n) + 1/3*a^2*d^2*x^3 + 2/27*
(n^2*x^3 - 3*n*x^3*log(c*x^n))*b^2*d^2 + 1/16*(n^2*x^4 - 4*n*x^4*log(c*x^n
))*b^2*d*e + 2/125*(n^2*x^5 - 5*n*x^5*log(c*x^n))*b^2*e^2
```

3.84.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 408 vs. $2(160) = 320$.

Time = 0.38 (sec) , antiderivative size = 408, normalized size of antiderivative = 2.29

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx = \frac{1}{5}b^2e^2n^2x^5\log(x)^2 - \frac{2}{25}b^2e^2n^2x^5\log(x) + \frac{2}{5}b^2e^2nx^5\log(c)\log(x) + \frac{1}{2}b^2den^2x^4\log(x)^2 + \frac{2}{125}b^2e^2n^2x^5 - \frac{2}{25}b^2e^2nx^5\log(c) + \frac{1}{5}b^2e^2x^5\log(c)^2 - \frac{1}{4}b^2den^2x^4\log(x) + \frac{2}{5}abe^2nx^5\log(x) + b^2denx^4\log(c)\log(x) + \frac{1}{3}b^2d^2n^2x^3\log(x)^2 + \frac{1}{16}b^2den^2x^4 - \frac{2}{25}abe^2nx^5 - \frac{1}{4}b^2denx^4\log(c) + \frac{2}{5}abe^2x^5\log(c) + \frac{1}{2}b^2dex^4\log(c)^2 - \frac{2}{9}b^2d^2n^2x^3\log(x) + abdenx^4\log(x) + \frac{2}{3}b^2d^2nx^3\log(c)\log(x) + \frac{2}{27}b^2d^2n^2x^3 - \frac{1}{4}abdenx^4 + \frac{1}{5}a^2e^2x^5 - \frac{2}{9}b^2d^2nx^3\log(c) + abdex^4\log(c) + \frac{1}{3}b^2d^2x^3\log(c)^2 + \frac{2}{3}abd^2nx^3\log(x) - \frac{2}{9}abd^2nx^3 + \frac{1}{2}a^2dex^4 + \frac{2}{3}abd^2x^3\log(c) + \frac{1}{3}a^2d^2x^3$$

input
```
integrate(x^2*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/5*b^2*e^2*n^2*x^5*log(x)^2 - 2/25*b^2*e^2*n^2*x^5*log(x) + 2/5*b^2*e^2*n
*x^5*log(c)*log(x) + 1/2*b^2*d*e*n^2*x^4*log(x)^2 + 2/125*b^2*e^2*n^2*x^5
- 2/25*b^2*e^2*n*x^5*log(c) + 1/5*b^2*e^2*x^5*log(c)^2 - 1/4*b^2*d*e*n^2*x
^4*log(x) + 2/5*a*b*e^2*n*x^5*log(x) + b^2*d*e*n*x^4*log(c)*log(x) + 1/3*b
^2*d^2*n^2*x^3*log(x)^2 + 1/16*b^2*d*e*n^2*x^4 - 2/25*a*b*e^2*n*x^5 - 1/4*
b^2*d*e*n*x^4*log(c) + 2/5*a*b*e^2*x^5*log(c) + 1/2*b^2*d*e*x^4*log(c)^2 -
 2/9*b^2*d^2*n^2*x^3*log(x) + a*b*d*e*n*x^4*log(x) + 2/3*b^2*d^2*n*x^3*log
(c)*log(x) + 2/27*b^2*d^2*n^2*x^3 - 1/4*a*b*d*e*n*x^4 + 1/5*a^2*e^2*x^5 -
2/9*b^2*d^2*n*x^3*log(c) + a*b*d*e*x^4*log(c) + 1/3*b^2*d^2*x^3*log(c)^2 +
 2/3*a*b*d^2*n*x^3*log(x) - 2/9*a*b*d^2*n*x^3 + 1/2*a^2*d*e*x^4 + 2/3*a*b*
d^2*x^3*log(c) + 1/3*a^2*d^2*x^3
```

3.84.9 Mupad [B] (verification not implemented)

Time = 0.50 (sec) , antiderivative size = 180, normalized size of antiderivative = 1.01

$$\int x^2(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx=\ln\left(c\,x^n\right)\,\left(\frac{2\,b\,\left(3\,a-b\,n\right)\,d^2\,x^3}{9}+\frac{b\,\left(4\,a-b\,n\right)\,d\,e\,x^4}{4}+\frac{2\,b\,\left(5\,a-b\,n\right)\,e^2\,x^5}{25}\right)+\ln\left(c\,x^n\right)^2\,\left(\frac{b^2\,d^2\,x^3}{3}+\frac{b^2\,d\,e\,x^4}{2}+\frac{b^2\,e^2\,x^5}{5}\right)+\frac{d^2\,x^3\,\left(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2\right)}{27}+\frac{e^2\,x^5\,\left(25\,a^2-10\,a\,b\,n+2\,b^2\,n^2\right)}{125}+\frac{d\,e\,x^4\,\left(8\,a^2-4\,a\,b\,n+b^2\,n^2\right)}{16}$$

input
```
int(x^2*(a + b*log(c*x^n))^2*(d + e*x)^2,x)
```

output
```
log(c*x^n)*((2*b*d^2*x^3*(3*a - b*n))/9 + (2*b*e^2*x^5*(5*a - b*n))/25 + (
b*d*e*x^4*(4*a - b*n))/4) + log(c*x^n)^2*((b^2*d^2*x^3)/3 + (b^2*e^2*x^5)/
5 + (b^2*d*e*x^4)/2) + (d^2*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*n))/27 + (e^2*x
^5*(25*a^2 + 2*b^2*n^2 - 10*a*b*n))/125 + (d*e*x^4*(8*a^2 + b^2*n^2 - 4*a*
b*n))/16
```

3.85 $\int x(d+ex)^2 (a+b\log(cx^n))^2\,dx$

3.85.1 Optimal result

Integrand size = 21, antiderivative size = 178

$$\begin{aligned}\int x(d+ex)^2 (a+b\log(cx^n))^2\,dx &= \frac{1}{4}b^2d^2n^2x^2+\frac{4}{27}b^2den^2x^3+\frac{1}{32}b^2e^2n^2x^4\\ &\quad-\frac{1}{2}bd^2nx^2(a+b\log(cx^n))-\frac{4}{9}bdenx^3(a+b\log(cx^n))\\ &\quad-\frac{1}{8}be^2nx^4(a+b\log(cx^n))+\frac{1}{2}d^2x^2(a+b\log(cx^n))^2\\ &\quad+\frac{2}{3}dex^3(a+b\log(cx^n))^2+\frac{1}{4}e^2x^4(a+b\log(cx^n))^2\end{aligned}$$

output
```
1/4*b^2*d^2*n^2*x^2+4/27*b^2*d*e*n^2*x^3+1/32*b^2*e^2*n^2*x^4-1/2*b*d^2*n*
x^2*(a+b*ln(c*x^n))-4/9*b*d*e*n*x^3*(a+b*ln(c*x^n))-1/8*b*e^2*n*x^4*(a+b*l
n(c*x^n))+1/2*d^2*x^2*(a+b*ln(c*x^n))^2+2/3*d*e*x^3*(a+b*ln(c*x^n))^2+1/4*
e^2*x^4*(a+b*ln(c*x^n))^2
```

3.85.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 134, normalized size of antiderivative = 0.75

$$\begin{aligned}\int x(d+ex)^2 (a+b\log(cx^n))^2\,dx &= \frac{1}{864}x^2\big(27be^2nx^2(-4a+bn-4b\log(cx^n))\\ &\quad+128bdenx(-3a+bn-3b\log(cx^n))\\ &\quad+216bd^2n(-2a+bn-2b\log(cx^n))\\ &\quad+432d^2(a+b\log(cx^n))^2+576dex(a+b\log(cx^n))^2\\ &\quad+216e^2x^2(a+b\log(cx^n))^2\big)\end{aligned}$$

input
```
Integrate[x*(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
(x^2*(27*b*e^2*n*x^2*(-4*a + b*n - 4*b*Log[c*x^n]) + 128*b*d*e*n*x*(-3*a +
 b*n - 3*b*Log[c*x^n]) + 216*b*d^2*n*(-2*a + b*n - 2*b*Log[c*x^n]) + 432*d
^2*(a + b*Log[c*x^n])^2 + 576*d*e*x*(a + b*Log[c*x^n])^2 + 216*e^2*x^2*(a
+ b*Log[c*x^n])^2))/864
```

3.85.3 Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 178, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(d^2x(a+b\log\left(cx^n\right))^2+2dex^2(a+b\log\left(cx^n\right))^2+e^2x^3(a+b\log\left(cx^n\right))^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}d^2x^2(a+b\log\left(cx^n\right))^2-\frac{1}{2}bd^2nx^2(a+b\log\left(cx^n\right))+\frac{2}{3}dex^3(a+b\log\left(cx^n\right))^2-\frac{4}{9}bdenx^3(a+b\log\left(cx^n\right))+\frac{1}{4}e^2x^4(a+b\log\left(cx^n\right))^2-\frac{1}{8}be^2nx^4(a+b\log\left(cx^n\right))+\frac{1}{4}b^2d^2n^2x^2+\frac{4}{27}b^2den^2x^3+\frac{1}{32}b^2e^2n^2x^4$$

input
```
Int[x*(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
(b^2*d^2*n^2*x^2)/4 + (4*b^2*d*e*n^2*x^3)/27 + (b^2*e^2*n^2*x^4)/32 - (b*d
^2*n*x^2*(a + b*Log[c*x^n]))/2 - (4*b*d*e*n*x^3*(a + b*Log[c*x^n]))/9 - (b
*e^2*n*x^4*(a + b*Log[c*x^n]))/8 + (d^2*x^2*(a + b*Log[c*x^n])^2)/2 + (2*d
*e*x^3*(a + b*Log[c*x^n])^2)/3 + (e^2*x^4*(a + b*Log[c*x^n])^2)/4
```

3.85.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.85.4 Maple [A] (verified)

Time = 2.64 (sec) , antiderivative size = 262, normalized size of antiderivative = 1.47

method	result
parallelrisch	$\frac{x^4b^2\ln(c\,x^n)^2e^2}{4}-\frac{\ln(c\,x^n)x^4n\,e^2b^2}{8}+\frac{b^2e^2n^2x^4}{32}+\frac{x^4ab\ln(c\,x^n)e^2}{2}-\frac{ab\,e^2n\,x^4}{8}+\frac{2x^3b^2\ln(c\,x^n)^2de}{3}-\frac{4\ln(c\,x^n)x^3}{9}$
risch	Expression too large to display

input
```
int(x*(e*x+d)^2*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
1/4*x^4*b^2*ln(c*x^n)^2*e^2-1/8*ln(c*x^n)*x^4*n*e^2*b^2+1/32*b^2*e^2*n^2*x
^4+1/2*x^4*a*b*ln(c*x^n)*e^2-1/8*a*b*e^2*n*x^4+2/3*x^3*b^2*ln(c*x^n)^2*d*e
-4/9*ln(c*x^n)*x^3*n*d*e*b^2+4/27*b^2*d*e*n^2*x^3+1/4*x^4*a^2*e^2+4/3*x^3*
a*b*ln(c*x^n)*d*e-4/9*a*b*d*e*n*x^3+1/2*x^2*b^2*ln(c*x^n)^2*d^2-1/2*ln(c*x
^n)*x^2*n*b^2*d^2+1/4*b^2*d^2*n^2*x^2+2/3*x^3*a^2*d*e+x^2*a*b*ln(c*x^n)*d^
2-1/2*a*b*d^2*n*x^2+1/2*x^2*a^2*d^2
```

3.85.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 363 vs. $2(160) = 320$.

Time = 0.27 (sec) , antiderivative size = 363, normalized size of antiderivative = 2.04

$$\int x(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx$$
$$= \frac{1}{32}\left(b^2e^2n^2-4\,abe^2n+8\,a^2e^2\right)x^4+\frac{2}{27}\left(2\,b^2den^2-6\,abden+9\,a^2de\right)x^3$$
$$+\frac{1}{4}\left(b^2d^2n^2-2\,abd^2n+2\,a^2d^2\right)x^2+\frac{1}{12}\left(3\,b^2e^2x^4+8\,b^2dex^3+6\,b^2d^2x^2\right)\log\left(c\right)^2$$
$$+\frac{1}{12}\left(3\,b^2e^2n^2x^4+8\,b^2den^2x^3+6\,b^2d^2n^2x^2\right)\log\left(x\right)^2$$
$$-\frac{1}{72}\left(9\left(b^2e^2n-4\,abe^2\right)x^4+32\left(b^2den-3\,abde\right)x^3+36\left(b^2d^2n-2\,abd^2\right)x^2\right)\log\left(c\right)$$
$$-\frac{1}{72}\left(9\left(b^2e^2n^2-4\,abe^2n\right)x^4+32\left(b^2den^2-3\,abden\right)x^3+36\left(b^2d^2n^2-2\,abd^2n\right)x^2-12\left(3\,b^2e^2nx^4+8\,b\right.\right.$$

input
```
integrate(x*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
1/32*(b^2*e^2*n^2 - 4*a*b*e^2*n + 8*a^2*e^2)*x^4 + 2/27*(2*b^2*d*e*n^2 - 6
*a*b*d*e*n + 9*a^2*d*e)*x^3 + 1/4*(b^2*d^2*n^2 - 2*a*b*d^2*n + 2*a^2*d^2)*
x^2 + 1/12*(3*b^2*e^2*x^4 + 8*b^2*d*e*x^3 + 6*b^2*d^2*x^2)*log(c)^2 + 1/12
*(3*b^2*e^2*n^2*x^4 + 8*b^2*d*e*n^2*x^3 + 6*b^2*d^2*n^2*x^2)*log(x)^2 - 1/
72*(9*(b^2*e^2*n - 4*a*b*e^2)*x^4 + 32*(b^2*d*e*n - 3*a*b*d*e)*x^3 + 36*(b
^2*d^2*n - 2*a*b*d^2)*x^2)*log(c) - 1/72*(9*(b^2*e^2*n^2 - 4*a*b*e^2*n)*x^
4 + 32*(b^2*d*e*n^2 - 3*a*b*d*e*n)*x^3 + 36*(b^2*d^2*n^2 - 2*a*b*d^2*n)*x^
2 - 12*(3*b^2*e^2*n*x^4 + 8*b^2*d*e*n*x^3 + 6*b^2*d^2*n*x^2)*log(c))*log(x
)
```

3.85.6 Sympy [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 308, normalized size of antiderivative = 1.73

$$\int x(d+ex)^2 (a+b\log(cx^n))^2 \, dx = \frac{a^2d^2x^2}{2} + \frac{2a^2dex^3}{3} + \frac{a^2e^2x^4}{4} - \frac{abd^2nx^2}{2} + abd^2x^2\log(cx^n) - \frac{4abdenx^3}{9} + \frac{4abdex^3\log(cx^n)}{3} - \frac{abe^2nx^4}{8} + \frac{abe^2x^4\log(cx^n)}{2} + \frac{b^2d^2n^2x^2}{4} - \frac{b^2d^2nx^2\log(cx^n)}{2} + \frac{b^2d^2x^2\log(cx^n)^2}{2} + \frac{4b^2den^2x^3}{27} - \frac{4b^2denx^3\log(cx^n)}{9} + \frac{2b^2dex^3\log(cx^n)^2}{3} + \frac{b^2e^2n^2x^4}{32} - \frac{b^2e^2nx^4\log(cx^n)}{8} + \frac{b^2e^2x^4\log(cx^n)^2}{4}$$

input
```
integrate(x*(e*x+d)**2*(a+b*ln(c*x**n))**2,x)
```

output
```
a**2*d**2*x**2/2 + 2*a**2*d*e*x**3/3 + a**2*e**2*x**4/4 - a*b*d**2*n*x**2/
2 + a*b*d**2*x**2*log(c*x**n) - 4*a*b*d*e*n*x**3/9 + 4*a*b*d*e*x**3*log(c*
x**n)/3 - a*b*e**2*n*x**4/8 + a*b*e**2*x**4*log(c*x**n)/2 + b**2*d**2*n**2
*x**2/4 - b**2*d**2*n*x**2*log(c*x**n)/2 + b**2*d**2*x**2*log(c*x**n)**2/2
 + 4*b**2*d*e*n**2*x**3/27 - 4*b**2*d*e*n*x**3*log(c*x**n)/9 + 2*b**2*d*e*
x**3*log(c*x**n)**2/3 + b**2*e**2*n**2*x**4/32 - b**2*e**2*n*x**4*log(c*x*
*n)/8 + b**2*e**2*x**4*log(c*x**n)**2/4
```

3.85.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 250, normalized size of antiderivative = 1.40

$$\int x(d+ex)^2 (a+b\log(cx^n))^2 \,dx = \frac{1}{4}b^2e^2x^4\log(cx^n)^2 - \frac{1}{8}abe^2nx^4 + \frac{1}{2}abe^2x^4\log(cx^n) + \frac{2}{3}b^2dex^3\log(cx^n)^2 - \frac{4}{9}abdenx^3 + \frac{1}{4}a^2e^2x^4 + \frac{4}{3}abdex^3\log(cx^n) + \frac{1}{2}b^2d^2x^2\log(cx^n)^2 - \frac{1}{2}abd^2nx^2 + \frac{2}{3}a^2dex^3 + abd^2x^2\log(cx^n) + \frac{1}{2}a^2d^2x^2 + \frac{1}{4}(n^2x^2 - 2nx^2\log(cx^n))b^2d^2 + \frac{4}{27}(n^2x^3 - 3nx^3\log(cx^n))b^2de + \frac{1}{32}(n^2x^4 - 4nx^4\log(cx^n))b^2e^2$$

input
```
integrate(x*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/4*b^2*e^2*x^4*log(c*x^n)^2 - 1/8*a*b*e^2*n*x^4 + 1/2*a*b*e^2*x^4*log(c*x
^n) + 2/3*b^2*d*e*x^3*log(c*x^n)^2 - 4/9*a*b*d*e*n*x^3 + 1/4*a^2*e^2*x^4 +
 4/3*a*b*d*e*x^3*log(c*x^n) + 1/2*b^2*d^2*x^2*log(c*x^n)^2 - 1/2*a*b*d^2*n
*x^2 + 2/3*a^2*d*e*x^3 + a*b*d^2*x^2*log(c*x^n) + 1/2*a^2*d^2*x^2 + 1/4*(n
^2*x^2 - 2*n*x^2*log(c*x^n))*b^2*d^2 + 4/27*(n^2*x^3 - 3*n*x^3*log(c*x^n))
*b^2*d*e + 1/32*(n^2*x^4 - 4*n*x^4*log(c*x^n))*b^2*e^2
```

3.85.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 408 vs. $2(160) = 320$.

Time = 0.36 (sec) , antiderivative size = 408, normalized size of antiderivative = 2.29

$$\int x(d+ex)^2 (a+b\log(cx^n))^2 \, dx = \frac{1}{4} b^2e^2n^2x^4\log(x)^2 - \frac{1}{8} b^2e^2n^2x^4\log(x) + \frac{1}{2} b^2e^2nx^4\log(c)\log(x) + \frac{2}{3} b^2den^2x^3\log(x)^2 + \frac{1}{32} b^2e^2n^2x^4 - \frac{1}{8} b^2e^2nx^4\log(c) + \frac{1}{4} b^2e^2x^4\log(c)^2 - \frac{4}{9} b^2den^2x^3\log(x) + \frac{1}{2} abe^2nx^4\log(x) + \frac{4}{3} b^2denx^3\log(c)\log(x) + \frac{1}{2} b^2d^2n^2x^2\log(x)^2 + \frac{4}{27} b^2den^2x^3 - \frac{1}{8} abe^2nx^4 - \frac{4}{9} b^2denx^3\log(c) + \frac{1}{2} abe^2x^4\log(c) + \frac{2}{3} b^2dex^3\log(c)^2 - \frac{1}{2} b^2d^2n^2x^2\log(x) + \frac{4}{3} abdenx^3\log(x) + b^2d^2nx^2\log(c)\log(x) + \frac{1}{4} b^2d^2n^2x^2 - \frac{4}{9} abdenx^3 + \frac{1}{4} a^2e^2x^4 - \frac{1}{2} b^2d^2nx^2\log(c) + \frac{4}{3} abdex^3\log(c) + \frac{1}{2} b^2d^2x^2\log(c)^2 + abd^2nx^2\log(x) - \frac{1}{2} abd^2nx^2 + \frac{2}{3} a^2dex^3 + abd^2x^2\log(c) + \frac{1}{2} a^2d^2x^2$$

input
```
integrate(x*(e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/4*b^2*e^2*n^2*x^4*log(x)^2 - 1/8*b^2*e^2*n^2*x^4*log(x) + 1/2*b^2*e^2*n*
x^4*log(c)*log(x) + 2/3*b^2*d*e*n^2*x^3*log(x)^2 + 1/32*b^2*e^2*n^2*x^4 -
1/8*b^2*e^2*n*x^4*log(c) + 1/4*b^2*e^2*x^4*log(c)^2 - 4/9*b^2*d*e*n^2*x^3*
log(x) + 1/2*a*b*e^2*n*x^4*log(x) + 4/3*b^2*d*e*n*x^3*log(c)*log(x) + 1/2*
b^2*d^2*n^2*x^2*log(x)^2 + 4/27*b^2*d*e*n^2*x^3 - 1/8*a*b*e^2*n*x^4 - 4/9*
b^2*d*e*n*x^3*log(c) + 1/2*a*b*e^2*x^4*log(c) + 2/3*b^2*d*e*x^3*log(c)^2 -
 1/2*b^2*d^2*n^2*x^2*log(x) + 4/3*a*b*d*e*n*x^3*log(x) + b^2*d^2*n*x^2*log
(c)*log(x) + 1/4*b^2*d^2*n^2*x^2 - 4/9*a*b*d*e*n*x^3 + 1/4*a^2*e^2*x^4 - 1
/2*b^2*d^2*n*x^2*log(c) + 4/3*a*b*d*e*x^3*log(c) + 1/2*b^2*d^2*x^2*log(c)^
2 + a*b*d^2*n*x^2*log(x) - 1/2*a*b*d^2*n*x^2 + 2/3*a^2*d*e*x^3 + a*b*d^2*x
^2*log(c) + 1/2*a^2*d^2*x^2
```

3.85.9 Mupad [B] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 179, normalized size of antiderivative = 1.01

$$\int x(d+ex)^2 (a+b\log(cx^n))^2 \, dx = \ln(c\,x^n) \left(\frac{b\,(2\,a-b\,n)\;d^2\,x^2}{2} + \frac{4\,b\,(3\,a-b\,n)\;d\,e\,x^3}{9} + \frac{b\,(4\,a-b\,n)\;e^2\,x^4}{8}\right) + \ln(c\,x^n)^2\left(\frac{b^2\,d^2\,x^2}{2} + \frac{2\,b^2\,d\,e\,x^3}{3} + \frac{b^2\,e^2\,x^4}{4}\right) + \frac{d^2\,x^2\,(2\,a^2-2\,a\,b\,n+b^2\,n^2)}{4} + \frac{e^2\,x^4\,(8\,a^2-4\,a\,b\,n+b^2\,n^2)}{32} + \frac{2\,d\,e\,x^3\,(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2)}{27}$$

input
```
int(x*(a + b*log(c*x^n))^2*(d + e*x)^2,x)
```

output
```
log(c*x^n)*((b*d^2*x^2*(2*a - b*n))/2 + (b*e^2*x^4*(4*a - b*n))/8 + (4*b*d
*e*x^3*(3*a - b*n))/9) + log(c*x^n)^2*((b^2*d^2*x^2)/2 + (b^2*e^2*x^4)/4 +
 (2*b^2*d*e*x^3)/3) + (d^2*x^2*(2*a^2 + b^2*n^2 - 2*a*b*n))/4 + (e^2*x^4*(
8*a^2 + b^2*n^2 - 4*a*b*n))/32 + (2*d*e*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*n))
/27
```

3.86 $\int (d+ex)^2 (a+b\log(cx^n))^2 \, dx$

3.86.1 Optimal result

Integrand size = 20, antiderivative size = 173

$$\begin{aligned}\int (d+ex)^2 (a+b\log(cx^n))^2 \, dx = {} & 2b^2d^2n^2x + \frac{1}{2}b^2den^2x^2 + \frac{2}{27}b^2e^2n^2x^3 \\ & + \frac{b^2d^3n^2\log^2(x)}{3e} - 2bd^2nx(a+b\log(cx^n)) \\ & - bdenx^2(a+b\log(cx^n)) - \frac{2}{9}be^2nx^3(a+b\log(cx^n)) \\ & - \frac{2bd^3n\log(x)(a+b\log(cx^n))}{3e} \\ & + \frac{(d+ex)^3(a+b\log(cx^n))^2}{3e}\end{aligned}$$

output
```
2*b^2*d^2*n^2*x+1/2*b^2*d*e*n^2*x^2+2/27*b^2*e^2*n^2*x^3+1/3*b^2*d^3*n^2*l
n(x)^2/e-2*b*d^2*n*x*(a+b*ln(c*x^n))-b*d*e*n*x^2*(a+b*ln(c*x^n))-2/9*b*e^2
*n*x^3*(a+b*ln(c*x^n))-2/3*b*d^3*n*ln(x)*(a+b*ln(c*x^n))/e+1/3*(e*x+d)^3*(
a+b*ln(c*x^n))^2/e
```

3.86.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 135, normalized size of antiderivative = 0.78

$$\int (d+ex)^2 (a+b\log (cx^n))^2 \, dx = \frac{2}{27}be^2nx^3(-3a+bn-3b\log (cx^n)) + \frac{1}{2}bdenx^2(-2a+bn-2b\log (cx^n)) + d^2x(a+b\log (cx^n))^2 + dex^2(a+b\log (cx^n))^2 + \frac{1}{3}e^2x^3(a+b\log (cx^n))^2 - 2bd^2nx(a-bn+b\log (cx^n))$$

input
```
Integrate[(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
(2*b*e^2*n*x^3*(-3*a + b*n - 3*b*Log[c*x^n]))/27 + (b*d*e*n*x^2*(-2*a + b*
n - 2*b*Log[c*x^n]))/2 + d^2*x*(a + b*Log[c*x^n])^2 + d*e*x^2*(a + b*Log[c
*x^n])^2 + (e^2*x^3*(a + b*Log[c*x^n])^2)/3 - 2*b*d^2*n*x*(a - b*n + b*Log
[c*x^n])
```

3.86.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 155, normalized size of antiderivative = 0.90, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.150, Rules used = {2756, 2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^2 (a+b\log (cx^n))^2 \, dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{(d+ex)^3 (a+b\log (cx^n))^2}{3e} - \frac{2bn\int \frac{(d+ex)^3(a+b\log(cx^n))}{x}dx}{3e}$$

$$\Big\downarrow \text{2772}$$

$$\frac{(d+ex)^3 (a+b\log (cx^n))^2}{3e} - \frac{2bn\left(-bn\int \left(\frac{\log(x)d^3}{x}+\frac{1}{6}e\left(18d^2+9exd+2e^2x^2\right)\right)dx + d^3\log(x)\left(a+b\log (cx^n)\right) + 3d^2ex(a+b\log (cx^n)) + \frac{3}{2}de^2}{3e}$$

$$\Big\downarrow \text{2009}$$

$$\frac{(d+ex)^3\,(a+b\log{(cx^n)})^2}{3e} - \frac{2bn\Big(d^3\log(x)\,(a+b\log{(cx^n)}) + 3d^2ex(a+b\log{(cx^n)}) + \frac{3}{2}de^2x^2(a+b\log{(cx^n)}) + \frac{1}{3}e^3x^3(a+b\log{(cx^n)}) - bn\Big(}{3e}$$

input
```
Int[(d + e*x)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
((d + e*x)^3*(a + b*Log[c*x^n])^2)/(3*e) - (2*b*n*(-(b*n*(3*d^2*e*x + (3*d
*e^2*x^2)/4 + (e^3*x^3)/9 + (d^3*Log[x]^2)/2)) + 3*d^2*e*x*(a + b*Log[c*x^
n]) + (3*d*e^2*x^2*(a + b*Log[c*x^n]))/2 + (e^3*x^3*(a + b*Log[c*x^n]))/3
+ d^3*Log[x]*(a + b*Log[c*x^n])))/(3*e)
```

3.86.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.86.4 Maple [A] (verified)

Time = 0.60 (sec) , antiderivative size = 247, normalized size of antiderivative = 1.43

method	result
parallelrisch	$\frac{b^2 \ln(c\,x^n)^2 e^2 x^3}{3} - \frac{2\ln(c\,x^n) x^3 n\, e^2 b^2}{9} + \frac{2b^2 e^2 n^2 x^3}{27} + \frac{2ab\ln(c\,x^n) e^2 x^3}{3} - \frac{2bna\,e^2 x^3}{9} + b^2 \ln\left(c\,x^n\right)^2 de\,x^2 - x^2$
risch	Expression too large to display

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
1/3*b^2*ln(c*x^n)^2*e^2*x^3-2/9*ln(c*x^n)*x^3*n*e^2*b^2+2/27*b^2*e^2*n^2*x
^3+2/3*a*b*ln(c*x^n)*e^2*x^3-2/9*b*n*a*e^2*x^3+b^2*ln(c*x^n)^2*d*e*x^2-x^2
*ln(c*x^n)*b^2*d*e*n+1/2*b^2*d*e*n^2*x^2+1/3*a^2*e^2*x^3+2*a*b*ln(c*x^n)*d
*e*x^2-b*n*a*d*e*x^2+x*b^2*ln(c*x^n)^2*d^2-2*x*ln(c*x^n)*b^2*d^2*n+2*b^2*d
^2*n^2*x+a^2*d*e*x^2+2*x*a*b*ln(c*x^n)*d^2-2*b*n*a*d^2*x+x*a^2*d^2
```

3.86.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 347 vs. 2(161) = 322.

Time = 0.27 (sec) , antiderivative size = 347, normalized size of antiderivative = 2.01

$$\begin{aligned}\int (d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx &= \frac{1}{27}\left(2\,b^2e^2n^2-6\,abe^2n+9\,a^2e^2\right)x^3\\ &+\frac{1}{2}\left(b^2den^2-2\,abden+2\,a^2de\right)x^2+\frac{1}{3}\left(b^2e^2x^3+3\,b^2dex^2+3\,b^2d^2x\right)\log\left(c\right)^2\\ &+\frac{1}{3}\left(b^2e^2n^2x^3+3\,b^2den^2x^2+3\,b^2d^2n^2x\right)\log\left(x\right)^2+\left(2\,b^2d^2n^2-2\,abd^2n+a^2d^2\right)x\\ &-\frac{1}{9}\left(2\left(b^2e^2n-3\,abe^2\right)x^3+9\left(b^2den-2\,abde\right)x^2+18\left(b^2d^2n-abd^2\right)x\right)\log\left(c\right)\\ &-\frac{1}{9}\left(2\left(b^2e^2n^2-3\,abe^2n\right)x^3+9\left(b^2den^2-2\,abden\right)x^2+18\left(b^2d^2n^2-abd^2n\right)x-6\left(b^2e^2nx^3+3\,b^2denx^2\right.\right.\end{aligned}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
1/27*(2*b^2*e^2*n^2 - 6*a*b*e^2*n + 9*a^2*e^2)*x^3 + 1/2*(b^2*d*e*n^2 - 2*
a*b*d*e*n + 2*a^2*d*e)*x^2 + 1/3*(b^2*e^2*x^3 + 3*b^2*d*e*x^2 + 3*b^2*d^2*
x)*log(c)^2 + 1/3*(b^2*e^2*n^2*x^3 + 3*b^2*d*e*n^2*x^2 + 3*b^2*d^2*n^2*x)*
log(x)^2 + (2*b^2*d^2*n^2 - 2*a*b*d^2*n + a^2*d^2)*x - 1/9*(2*(b^2*e^2*n -
 3*a*b*e^2)*x^3 + 9*(b^2*d*e*n - 2*a*b*d*e)*x^2 + 18*(b^2*d^2*n - a*b*d^2)
*x)*log(c) - 1/9*(2*(b^2*e^2*n^2 - 3*a*b*e^2*n)*x^3 + 9*(b^2*d*e*n^2 - 2*a
*b*d*e*n)*x^2 + 18*(b^2*d^2*n^2 - a*b*d^2*n)*x - 6*(b^2*e^2*n*x^3 + 3*b^2*
d*e*n*x^2 + 3*b^2*d^2*n*x)*log(c))*log(x)
```

3.86.6 Sympy [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 286, normalized size of antiderivative = 1.65

$$
\begin{aligned}
\int (d+ex)^2 (a+b\log(cx^n))^2\,dx = {} & a^2d^2x + a^2dex^2 + \frac{a^2e^2x^3}{3} - 2abd^2nx \\
& + 2abd^2x\log(cx^n) - abdenx^2 + 2abdex^2\log(cx^n) \\
& - \frac{2abe^2nx^3}{9} + \frac{2abe^2x^3\log(cx^n)}{3} + 2b^2d^2n^2x \\
& - 2b^2d^2nx\log(cx^n) + b^2d^2x\log(cx^n)^2 + \frac{b^2den^2x^2}{2} \\
& - b^2denx^2\log(cx^n) + b^2dex^2\log(cx^n)^2 + \frac{2b^2e^2n^2x^3}{27} \\
& - \frac{2b^2e^2nx^3\log(cx^n)}{9} + \frac{b^2e^2x^3\log(cx^n)^2}{3}
\end{aligned}
$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**2,x)
```

output
```
a**2*d**2*x + a**2*d*e*x**2 + a**2*e**2*x**3/3 - 2*a*b*d**2*n*x + 2*a*b*d*
*2*x*log(c*x**n) - a*b*d*e*n*x**2 + 2*a*b*d*e*x**2*log(c*x**n) - 2*a*b*e**
2*n*x**3/9 + 2*a*b*e**2*x**3*log(c*x**n)/3 + 2*b**2*d**2*n**2*x - 2*b**2*d
**2*n*x*log(c*x**n) + b**2*d**2*x*log(c*x**n)**2 + b**2*d*e*n**2*x**2/2 -
b**2*d*e*n*x**2*log(c*x**n) + b**2*d*e*x**2*log(c*x**n)**2 + 2*b**2*e**2*n
**2*x**3/27 - 2*b**2*e**2*n*x**3*log(c*x**n)/9 + b**2*e**2*x**3*log(c*x**n
)**2/3
```

3.86.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 235, normalized size of antiderivative = 1.36

$$\int (d+ex)^2 (a+b\log(cx^n))^2\,dx = \frac{1}{3}b^2e^2x^3\log(cx^n)^2 - \frac{2}{9}abe^2nx^3 + \frac{2}{3}abe^2x^3\log(cx^n) + b^2dex^2\log(cx^n)^2 - abdenx^2 + \frac{1}{3}a^2e^2x^3 + 2abdex^2\log(cx^n) + b^2d^2x\log(cx^n)^2 - 2abd^2nx + a^2dex^2 + 2abd^2x\log(cx^n) + 2\left(n^2x - nx\log(cx^n)\right)b^2d^2 + \frac{1}{2}\left(n^2x^2 - 2nx^2\log(cx^n)\right)b^2de + \frac{2}{27}\left(n^2x^3 - 3nx^3\log(cx^n)\right)b^2e^2 + a^2d^2x$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/3*b^2*e^2*x^3*log(c*x^n)^2 - 2/9*a*b*e^2*n*x^3 + 2/3*a*b*e^2*x^3*log(c*x
^n) + b^2*d*e*x^2*log(c*x^n)^2 - a*b*d*e*n*x^2 + 1/3*a^2*e^2*x^3 + 2*a*b*d
*e*x^2*log(c*x^n) + b^2*d^2*x*log(c*x^n)^2 - 2*a*b*d^2*n*x + a^2*d*e*x^2 +
 2*a*b*d^2*x*log(c*x^n) + 2*(n^2*x - n*x*log(c*x^n))*b^2*d^2 + 1/2*(n^2*x^
2 - 2*n*x^2*log(c*x^n))*b^2*d*e + 2/27*(n^2*x^3 - 3*n*x^3*log(c*x^n))*b^2*
e^2 + a^2*d^2*x
```

3.86.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 385 vs. 2(161) = 322.

Time = 0.36 (sec) , antiderivative size = 385, normalized size of antiderivative = 2.23

$$\int (d+ex)^2 (a+b\log(cx^n))^2\,dx = \frac{1}{3}b^2e^2n^2x^3\log(x)^2 - \frac{2}{9}b^2e^2n^2x^3\log(x) + \frac{2}{3}b^2e^2nx^3\log(c)\log(x) + b^2den^2x^2\log(x)^2 + \frac{2}{27}b^2e^2n^2x^3 - \frac{2}{9}b^2e^2nx^3\log(c) + \frac{1}{3}b^2e^2x^3\log(c)^2 - b^2den^2x^2\log(x) + \frac{2}{3}abe^2nx^3\log(x) + 2b^2denx^2\log(c)\log(x) + b^2d^2n^2x\log(x)^2 + \frac{1}{2}b^2den^2x^2 - \frac{2}{9}abe^2nx^3 - b^2denx^2\log(c) + \frac{2}{3}abe^2x^3\log(c) + b^2dex^2\log(c)^2 - 2b^2d^2n^2x\log(x) + 2abdenx^2\log(x) + 2b^2d^2nx\log(c)\log(x) + 2b^2d^2n^2x - abdenx^2 + \frac{1}{3}a^2e^2x^3 - 2b^2d^2nx\log(c) + 2abdex^2\log(c) + b^2d^2x\log(c)^2 + 2abd^2nx\log(x) - 2abd^2nx + a^2dex^2 + 2abd^2x\log(c) + a^2d^2x$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/3*b^2*e^2*n^2*x^3*log(x)^2 - 2/9*b^2*e^2*n^2*x^3*log(x) + 2/3*b^2*e^2*n*
x^3*log(c)*log(x) + b^2*d*e*n^2*x^2*log(x)^2 + 2/27*b^2*e^2*n^2*x^3 - 2/9*
b^2*e^2*n*x^3*log(c) + 1/3*b^2*e^2*x^3*log(c)^2 - b^2*d*e*n^2*x^2*log(x) +
 2/3*a*b*e^2*n*x^3*log(x) + 2*b^2*d*e*n*x^2*log(c)*log(x) + b^2*d^2*n^2*x*
log(x)^2 + 1/2*b^2*d*e*n^2*x^2 - 2/9*a*b*e^2*n*x^3 - b^2*d*e*n*x^2*log(c)
+ 2/3*a*b*e^2*x^3*log(c) + b^2*d*e*x^2*log(c)^2 - 2*b^2*d^2*n^2*x*log(x) +
 2*a*b*d*e*n*x^2*log(x) + 2*b^2*d^2*n*x*log(c)*log(x) + 2*b^2*d^2*n^2*x -
a*b*d*e*n*x^2 + 1/3*a^2*e^2*x^3 - 2*b^2*d^2*n*x*log(c) + 2*a*b*d*e*x^2*log
(c) + b^2*d^2*x*log(c)^2 + 2*a*b*d^2*n*x*log(x) - 2*a*b*d^2*n*x + a^2*d*e*
x^2 + 2*a*b*d^2*x*log(c) + a^2*d^2*x
```

3.86. $\int (d+ex)^2 (a+b\log(cx^n))^2\,dx$

3.86.9 Mupad [B] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 166, normalized size of antiderivative = 0.96

$$\int (d+ex)^2 (a+b\log(cx^n))^2\, dx = \ln(c\,x^n)^2 \left(b^2\,d^2\,x + b^2\,d\,e\,x^2 + \frac{b^2\,e^2\,x^3}{3}\right) + \ln(c\,x^n)\left(2\,b\,(a-b\,n)\,d^2\,x + b\,(2\,a-b\,n)\,d\,e\,x^2 + \frac{2\,b\,(3\,a-b\,n)\,e^2\,x^3}{9}\right) + d^2\,x\,(a^2 - 2\,a\,b\,n + 2\,b^2\,n^2) + \frac{e^2\,x^3\,(9\,a^2 - 6\,a\,b\,n + 2\,b^2\,n^2)}{27} + \frac{d\,e\,x^2\,(2\,a^2 - 2\,a\,b\,n + b^2\,n^2)}{2}$$

input
```
int((a + b*log(c*x^n))^2*(d + e*x)^2,x)
```

output
```
log(c*x^n)^2*(b^2*d^2*x + (b^2*e^2*x^3)/3 + b^2*d*e*x^2) + log(c*x^n)*((2*
b*e^2*x^3*(3*a - b*n))/9 + 2*b*d^2*x*(a - b*n) + b*d*e*x^2*(2*a - b*n)) +
d^2*x*(a^2 + 2*b^2*n^2 - 2*a*b*n) + (e^2*x^3*(9*a^2 + 2*b^2*n^2 - 6*a*b*n)
)/27 + (d*e*x^2*(2*a^2 + b^2*n^2 - 2*a*b*n))/2
```

3.87 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x} dx$

3.87.1 Optimal result

Integrand size = 23, antiderivative size = 137

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x} dx = -4abdenx + 4b^2den^2x + \frac{1}{4}b^2e^2n^2x^2 - 4b^2denx\log(cx^n) - \frac{1}{2}be^2nx^2(a+b\log(cx^n)) + 2dex(a+b\log(cx^n))^2 + \frac{1}{2}e^2x^2(a+b\log(cx^n))^2 + \frac{d^2(a+b\log(cx^n))^3}{3bn}$$

output
```
-4*a*b*d*e*n*x+4*b^2*d*e*n^2*x+1/4*b^2*e^2*n^2*x^2-4*b^2*d*e*n*x*ln(c*x^n)
-1/2*b*e^2*n*x^2*(a+b*ln(c*x^n))+2*d*e*x*(a+b*ln(c*x^n))^2+1/2*e^2*x^2*(a+
b*ln(c*x^n))^2+1/3*d^2*(a+b*ln(c*x^n))^3/b/n
```

3.87.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 114, normalized size of antiderivative = 0.83

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x} dx = \frac{1}{4}be^2nx^2(-2a+bn-2b\log(cx^n)) + 2dex(a+b\log(cx^n))^2 + \frac{1}{2}e^2x^2(a+b\log(cx^n))^2 + \frac{d^2(a+b\log(cx^n))^3}{3bn} - 4bdenx(a-bn+b\log(cx^n))$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(b*e^2*n*x^2*(-2*a + b*n - 2*b*Log[c*x^n]))/4 + 2*d*e*x*(a + b*Log[c*x^n])
^2 + (e^2*x^2*(a + b*Log[c*x^n])^2)/2 + (d^2*(a + b*Log[c*x^n])^3)/(3*b*n)
 - 4*b*d*e*n*x*(a - b*n + b*Log[c*x^n])
```

3.87.3 Rubi [A] (verified)

Time = 0.63 (sec) , antiderivative size = 169, normalized size of antiderivative = 1.23, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2788, 2767, 2009, 2788, 2733, 2009, 2739, 15}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x} dx$$

$$\Big\downarrow \text{2788}$$

$$e\int (d+ex)(a+b\log(cx^n))^2 dx + d\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}dx$$

$$\Big\downarrow \text{2767}$$

$$d\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}dx + e\int \left(d(a+b\log(cx^n))^2 + ex(a+b\log(cx^n))^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$d\int \frac{(d+ex)(a+b\log(cx^n))^2}{x}dx + e\left(dx(a+b\log(cx^n))^2 - \frac{1}{2}benx^2(a+b\log(cx^n)) + \frac{1}{2}ex^2(a+b\log(cx^n))^2 - 2abdnx - 2b^2dnx\log(cx^n) + 2b^2dn^2\right.$$

$$\Big\downarrow \text{2788}$$

$$d\left(d\int \frac{(a+b\log(cx^n))^2}{x}dx + e\int (a+b\log(cx^n))^2 dx\right) + e\left(dx(a+b\log(cx^n))^2 - \frac{1}{2}benx^2(a+b\log(cx^n)) + \frac{1}{2}ex^2(a+b\log(cx^n))^2 - 2abdnx - 2b^2dnx\log(cx^n) + 2b^2dn^2\right.$$

$$\Big\downarrow \text{2733}$$

$$d\left(d\int \frac{(a+b\log(cx^n))^2}{x}dx + e\left(x(a+b\log(cx^n))^2 - 2bn\int (a+b\log(cx^n))\,dx\right)\right) + e\left(dx(a+b\log(cx^n))^2 - \frac{1}{2}benx^2(a+b\log(cx^n)) + \frac{1}{2}ex^2(a+b\log(cx^n))^2 - 2abdnx - 2b^2dnx\log(cx^n) + 2b^2dn^2\right.$$

$$\Big\downarrow \text{ 2009}$$

$$d\left(d\int \frac{(a+b\log(cx^n))^2}{x}dx + e\left(x(a+b\log(cx^n))^2 - 2bn(ax+bx\log(cx^n)-bnx)\right)\right) + e\left(dx(a+b\log(cx^n))^2 - \frac{1}{2}benx^2(a+b\log(cx^n)) + \frac{1}{2}ex^2(a+b\log(cx^n))^2 - 2abdnx - 2b^2dnx\log(cx^n) + 2b^2dn^2\right.$$

$$\Big\downarrow \text{ 2739}$$

$$d\left(\frac{d\int (a+b\log(cx^n))^2\,d(a+b\log(cx^n))}{bn} + e\left(x(a+b\log(cx^n))^2 - 2bn(ax+bx\log(cx^n)-bnx)\right)\right) + e\left(dx(a+b\log(cx^n))^2 - \frac{1}{2}benx^2(a+b\log(cx^n)) + \frac{1}{2}ex^2(a+b\log(cx^n))^2 - 2abdnx - 2b^2dnx\log(cx^n) + 2b^2dn^2\right.$$

$$\Big\downarrow \text{ 15}$$

$$e\left(dx(a+b\log(cx^n))^2 - \frac{1}{2}benx^2(a+b\log(cx^n)) + \frac{1}{2}ex^2(a+b\log(cx^n))^2 - 2abdnx - 2b^2dnx\log(cx^n) + 2b^2dn^2\right. d\left(\frac{d(a+b\log(cx^n))^3}{3bn} + e\left(x(a+b\log(cx^n))^2 - 2bn(ax+bx\log(cx^n)-bnx)\right)\right)$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
e*(-2*a*b*d*n*x + 2*b^2*d*n^2*x + (b^2*e*n^2*x^2)/4 - 2*b^2*d*n*x*Log[c*x^
n] - (b*e*n*x^2*(a + b*Log[c*x^n]))/2 + d*x*(a + b*Log[c*x^n])^2 + (e*x^2*
(a + b*Log[c*x^n])^2)/2) + d*((d*(a + b*Log[c*x^n])^3)/(3*b*n) + e*(x*(a +
 b*Log[c*x^n])^2 - 2*b*n*(a*x - b*n*x + b*x*Log[c*x^n])))
```

3.87. $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x}\,dx$

3.87.3.1 Defintions of rubi rules used

rule 15
```
Int[(a_.)*(x_)^(m_.), x_Symbol] :> Simp[a*(x^(m + 1)/(m + 1)), x] /; FreeQ[
{a, m}, x] && NeQ[m, -1]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2733
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.), x_Symbol] :> Simp[x*(a + b
*Log[c*x^n])^p, x] - Simp[b*n*p   Int[(a + b*Log[c*x^n])^(p - 1), x], x] /;
 FreeQ[{a, b, c, n}, x] && GtQ[p, 0] && IntegerQ[2*p]
```

rule 2739
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/(x_), x_Symbol] :> Simp[1/(
b*n)   Subst[Int[x^p, x], x, a + b*Log[c*x^n]], x] /; FreeQ[{a, b, c, n, p}
, x]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

rule 2788
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Simp[d   Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x)
, x], x] + Simp[e   Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

3.87.4 Maple [A] (verified)

Time = 0.75 (sec) , antiderivative size = 223, normalized size of antiderivative = 1.63

method	result
parallelrisch	$\frac{6x^2 \ln(c\,x^n)^2 b^2 e^2 n - 6x^2 \ln(c\,x^n) b^2 e^2 n^2 + 3x^2 b^2 e^2 n^3 + 12x^2 \ln(c\,x^n) ab\,e^2 n - 6x^2 ab\,e^2 n^2 + 24x \ln(c\,x^n)^2 b^2 den - 48x \ln(c\,x^n) b^2 de}{12}$
risch	Expression too large to display

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

output
```
1/12*(6*x^2*ln(c*x^n)^2*b^2*e^2*n-6*x^2*ln(c*x^n)*b^2*e^2*n^2+3*x^2*b^2*e^
2*n^3+12*x^2*ln(c*x^n)*a*b*e^2*n-6*x^2*a*b*e^2*n^2+24*x*ln(c*x^n)^2*b^2*d*
e*n-48*x*ln(c*x^n)*b^2*d*e*n^2+48*x*b^2*d*e*n^3+6*x^2*a^2*e^2*n+48*x*ln(c*
x^n)*a*b*d*e*n-48*x*a*b*d*e*n^2+4*b^2*d^2*ln(c*x^n)^3+12*ln(x)*a^2*d^2*n+2
4*x*a^2*d*e*n+12*a*b*d^2*ln(c*x^n)^2)/n
```

3.87.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 293 vs. $2(129) = 258$.

Time = 0.29 (sec) , antiderivative size = 293, normalized size of antiderivative = 2.14

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x}\,dx$$
$$= \frac{1}{3}\,b^2d^2n^2\log(x)^3 + \frac{1}{4}\left(b^2e^2n^2 - 2\,abe^2n + 2\,a^2e^2\right)x^2 + \frac{1}{2}\left(b^2e^2x^2 + 4\,b^2dex\right)\log(c)^2$$
$$+ \frac{1}{2}\left(b^2e^2n^2x^2 + 4\,b^2den^2x + 2\,b^2d^2n\log(c) + 2\,abd^2n\right)\log(x)^2$$
$$+ 2\left(2\,b^2den^2 - 2\,abden + a^2de\right)x - \frac{1}{2}\left(\left(b^2e^2n - 2\,abe^2\right)x^2 + 8\left(b^2den - abde\right)x\right)\log(c)$$
$$+ \frac{1}{2}\left(2\,b^2d^2\log(c)^2 + 2\,a^2d^2 - \left(b^2e^2n^2 - 2\,abe^2n\right)x^2 - 8\left(b^2den^2 - abden\right)x + 2\left(b^2e^2nx^2 + 4\,b^2denx + 2\,a\right.\right.$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

output
```
1/3*b^2*d^2*n^2*log(x)^3 + 1/4*(b^2*e^2*n^2 - 2*a*b*e^2*n + 2*a^2*e^2)*x^2
 + 1/2*(b^2*e^2*x^2 + 4*b^2*d*e*x)*log(c)^2 + 1/2*(b^2*e^2*n^2*x^2 + 4*b^2
*d*e*n^2*x + 2*b^2*d^2*n*log(c) + 2*a*b*d^2*n)*log(x)^2 + 2*(2*b^2*d*e*n^2
 - 2*a*b*d*e*n + a^2*d*e)*x - 1/2*((b^2*e^2*n - 2*a*b*e^2)*x^2 + 8*(b^2*d*
e*n - a*b*d*e)*x)*log(c) + 1/2*(2*b^2*d^2*log(c)^2 + 2*a^2*d^2 - (b^2*e^2*
n^2 - 2*a*b*e^2*n)*x^2 - 8*(b^2*d*e*n^2 - a*b*d*e*n)*x + 2*(b^2*e^2*n*x^2
+ 4*b^2*d*e*n*x + 2*a*b*d^2)*log(c))*log(x)
```

3.87.6 Sympy [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 269, normalized size of antiderivative = 1.96

$$\int \frac{(d+ex)^2 (a+b\log{(cx^n)})^2}{x}\,dx$$
$$= \begin{cases} \frac{a^2d^2\log{(cx^n)}}{n} + 2a^2dex + \frac{a^2e^2x^2}{2} + \frac{abd^2\log{(cx^n)}^2}{n} - 4abdenx + 4abdex\log{(cx^n)} - \frac{abe^2nx^2}{2} + abe^2x^2\log{(cx^n)} \\ (a+b\log{(c)})^2\left(d^2\log{(x)} + 2dex + \frac{e^2x^2}{2}\right) \end{cases}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x,x)
```

output
```
Piecewise((a**2*d**2*log(c*x**n)/n + 2*a**2*d*e*x + a**2*e**2*x**2/2 + a*b
*d**2*log(c*x**n)**2/n - 4*a*b*d*e*n*x + 4*a*b*d*e*x*log(c*x**n) - a*b*e**
2*n*x**2/2 + a*b*e**2*x**2*log(c*x**n) + b**2*d**2*log(c*x**n)**3/(3*n) +
4*b**2*d*e*n**2*x - 4*b**2*d*e*n*x*log(c*x**n) + 2*b**2*d*e*x*log(c*x**n)*
*2 + b**2*e**2*n**2*x**2/4 - b**2*e**2*n*x**2*log(c*x**n)/2 + b**2*e**2*x*
*2*log(c*x**n)**2/2, Ne(n, 0)), ((a + b*log(c))**2*(d**2*log(x) + 2*d*e*x
+ e**2*x**2/2), True))
```

3.87.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 198, normalized size of antiderivative = 1.45

$$\begin{aligned}\int \frac{(d+ex)^2 (a+b\log{(cx^n)})^2}{x}\,dx = {} & \frac{1}{2}\,b^2e^2x^2\log{(cx^n)}^2 - \frac{1}{2}\,abe^2nx^2 \\ & + abe^2x^2\log{(cx^n)} + 2\,b^2dex\log{(cx^n)}^2 \\ & - 4\,abdenx + \frac{1}{2}\,a^2e^2x^2 + 4\,abdex\log{(cx^n)} \\ & + \frac{b^2d^2\log{(cx^n)}^3}{3\,n} + 4\left(n^2x - nx\log{(cx^n)}\right)b^2de \\ & + \frac{1}{4}\left(n^2x^2 - 2\,nx^2\log{(cx^n)}\right)b^2e^2 \\ & + 2\,a^2dex + \frac{abd^2\log{(cx^n)}^2}{n} + a^2d^2\log{(x)}\end{aligned}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

output
```
1/2*b^2*e^2*x^2*log(c*x^n)^2 - 1/2*a*b*e^2*n*x^2 + a*b*e^2*x^2*log(c*x^n)
+ 2*b^2*d*e*x*log(c*x^n)^2 - 4*a*b*d*e*n*x + 1/2*a^2*e^2*x^2 + 4*a*b*d*e*x
*log(c*x^n) + 1/3*b^2*d^2*log(c*x^n)^3/n + 4*(n^2*x - n*x*log(c*x^n))*b^2*
d*e + 1/4*(n^2*x^2 - 2*n*x^2*log(c*x^n))*b^2*e^2 + 2*a^2*d*e*x + a*b*d^2*l
og(c*x^n)^2/n + a^2*d^2*log(x)
```

3.87.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 285 vs. $2(129) = 258$.

Time = 0.39 (sec) , antiderivative size = 285, normalized size of antiderivative = 2.08

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x} dx = \frac{1}{3} b^2 d^2 n^2 \log(x)^3 + \frac{1}{4} \left(b^2 e^2 n^2 - 2 b^2 e^2 n \log(c) + 2 b^2 e^2 \log(c)^2 - 2 abe^2 n + 4 abe^2 \log(c) + 2 a^2 e^2\right) x^2 + \frac{1}{2} \left(b^2 e^2 n^2 x^2 + 4 b^2 den^2 x + 2 b^2 d^2 n \log(c) + 2 abd^2 n\right) \log(x)^2 + 2 \left(2 b^2 den^2 - 2 b^2 den \log(c) + b^2 de \log(c)^2 - 2 abden + 2 abde \log(c) + a^2 de\right) x + \left(b^2 d^2 \log(c)^2 + 2 abd^2 \log(c) + a^2 d^2\right) \log(x) - \frac{1}{2} \left(\left(b^2 e^2 n^2 - 2 b^2 e^2 n \log(c) - 2 abe^2 n\right) x^2 + 8 \left(b^2 den^2 - b^2 den \log(c) - abden\right) x\right) \log(x)$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

output
```
1/3*b^2*d^2*n^2*log(x)^3 + 1/4*(b^2*e^2*n^2 - 2*b^2*e^2*n*log(c) + 2*b^2*e
^2*log(c)^2 - 2*a*b*e^2*n + 4*a*b*e^2*log(c) + 2*a^2*e^2)*x^2 + 1/2*(b^2*e
^2*n^2*x^2 + 4*b^2*d*e*n^2*x + 2*b^2*d^2*n*log(c) + 2*a*b*d^2*n)*log(x)^2
+ 2*(2*b^2*d*e*n^2 - 2*b^2*d*e*n*log(c) + b^2*d*e*log(c)^2 - 2*a*b*d*e*n +
 2*a*b*d*e*log(c) + a^2*d*e)*x + (b^2*d^2*log(c)^2 + 2*a*b*d^2*log(c) + a^
2*d^2)*log(x) - 1/2*((b^2*e^2*n^2 - 2*b^2*e^2*n*log(c) - 2*a*b*e^2*n)*x^2
+ 8*(b^2*d*e*n^2 - b^2*d*e*n*log(c) - a*b*d*e*n)*x)*log(x)
```

3.87.9 Mupad [B] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x}\,dx = \ln(c\,x^n)^2 \left(\frac{b^2\,e^2\,x^2}{2}+2\,b^2\,d\,e\,x+\frac{a\,b\,d^2}{n}\right) + \ln(c\,x^n)\left(\frac{b\,(2\,a-b\,n)\,e^2\,x^2}{2}+4\,b\,d\,(a-b\,n)\,e\,x\right) + a^2\,d^2\,\ln(x)+\frac{e^2\,x^2\,(2\,a^2-2\,a\,b\,n+b^2\,n^2)}{4} + 2\,d\,e\,x\,\left(a^2-2\,a\,b\,n+2\,b^2\,n^2\right)+\frac{b^2\,d^2\ln(c\,x^n)^3}{3\,n}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x,x)
```

output
```
log(c*x^n)^2*((b^2*e^2*x^2)/2 + 2*b^2*d*e*x + (a*b*d^2)/n) + log(c*x^n)*((
b*e^2*x^2*(2*a - b*n))/2 + 4*b*d*e*x*(a - b*n)) + a^2*d^2*log(x) + (e^2*x^
2*(2*a^2 + b^2*n^2 - 2*a*b*n))/4 + 2*d*e*x*(a^2 + 2*b^2*n^2 - 2*a*b*n) + (
b^2*d^2*log(c*x^n)^3)/(3*n)
```

3.88 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^2}\,dx$

3.88.1 Optimal result

Integrand size = 23, antiderivative size = 133

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2}\,dx = -\frac{2b^2d^2n^2}{x} - 2abe^2nx + 2b^2e^2n^2x - 2b^2e^2nx\log(cx^n) - \frac{2bd^2n(a+b\log(cx^n))}{x} - \frac{d^2(a+b\log(cx^n))^2}{x} + e^2x(a+b\log(cx^n))^2 + \frac{2de(a+b\log(cx^n))^3}{3bn}$$

output
```
-2*b^2*d^2*n^2/x-2*a*b*e^2*n*x+2*b^2*e^2*n^2*x-2*b^2*e^2*n*x*ln(c*x^n)-2*b
*d^2*n*(a+b*ln(c*x^n))/x-d^2*(a+b*ln(c*x^n))^2/x+e^2*x*(a+b*ln(c*x^n))^2+2
/3*d*e*(a+b*ln(c*x^n))^3/b/n
```

3.88.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 107, normalized size of antiderivative = 0.80

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2}\,dx = -\frac{d^2(a+b\log(cx^n))^2}{x} + e^2x(a+b\log(cx^n))^2 + \frac{2de(a+b\log(cx^n))^3}{3bn} - 2be^2nx(a-bn+b\log(cx^n)) - \frac{2bd^2n(a+bn+b\log(cx^n))}{x}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^2,x]
```

output
```
-((d^2*(a + b*Log[c*x^n])^2)/x) + e^2*x*(a + b*Log[c*x^n])^2 + (2*d*e*(a +
 b*Log[c*x^n])^3)/(3*b*n) - 2*b*e^2*n*x*(a - b*n + b*Log[c*x^n]) - (2*b*d^
2*n*(a + b*n + b*Log[c*x^n]))/x
```

3.88.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2} dx$$

$$\Big\downarrow \text{ 2795}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{x^2}+\frac{2de(a+b\log(cx^n))^2}{x}+e^2(a+b\log(cx^n))^2\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^2(a+b\log(cx^n))^2}{x}-\frac{2bd^2n(a+b\log(cx^n))}{x}+\frac{2de(a+b\log(cx^n))^3}{3bn}+e^2x(a+b\log(cx^n))^2-2abe^2nx-2b^2e^2nx\log(cx^n)-\frac{2b^2d^2n^2}{x}+2b^2e^2n^2x$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^2,x]
```

output
```
(-2*b^2*d^2*n^2)/x - 2*a*b*e^2*n*x + 2*b^2*e^2*n^2*x - 2*b^2*e^2*n*x*Log[c
*x^n] - (2*b*d^2*n*(a + b*Log[c*x^n]))/x - (d^2*(a + b*Log[c*x^n])^2)/x +
e^2*x*(a + b*Log[c*x^n])^2 + (2*d*e*(a + b*Log[c*x^n])^3)/(3*b*n)
```

3.88.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.88.4 Maple [A] (verified)

Time = 0.75 (sec) , antiderivative size = 226, normalized size of antiderivative = 1.70

method	result
parallelrisch	$\frac{3x^2\ln(cx^n)^2b^2e^2n-6x^2\ln(cx^n)b^2e^2n^2+6x^2b^2e^2n^3+6x^2\ln(cx^n)ab\,e^2n-6x^2ab\,e^2n^2+2de\,b^2\ln(cx^n)^3x+6\ln(x)x\,a^2den+3x^2}{3xn}$
risch	Expression too large to display

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^2/x^2,x,method=_RETURNVERBOSE)
```

output
```
1/3/x*(3*x^2*ln(c*x^n)^2*b^2*e^2*n-6*x^2*ln(c*x^n)*b^2*e^2*n^2+6*x^2*b^2*e
^2*n^3+6*x^2*ln(c*x^n)*a*b*e^2*n-6*x^2*a*b*e^2*n^2+2*d*e*b^2*ln(c*x^n)^3*x
+6*ln(x)*x*a^2*d*e*n+3*x^2*a^2*e^2*n+6*a*d*e*b*ln(c*x^n)^2*x-3*ln(c*x^n)^2
*b^2*d^2*n-6*ln(c*x^n)*b^2*d^2*n^2-6*b^2*d^2*n^3-6*ln(c*x^n)*a*b*d^2*n-6*a
*b*d^2*n^2-3*a^2*d^2*n)/n
```

3.88.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 291 vs. 2(131) = 262.

Time = 0.29 (sec) , antiderivative size = 291, normalized size of antiderivative = 2.19

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2}\,dx = \frac{2\,b^2den^2x\log(x)^3-6\,b^2d^2n^2-6\,abd^2n-3\,a^2d^2+3\,(2\,b^2e^2n^2-2\,abe^2n+a^2e^2)x^2+3\,(b^2e^2x^2-b^2d^2)\log}{}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^2,x, algorithm="fricas")
```

output
```
1/3*(2*b^2*d*e*n^2*x*log(x)^3 - 6*b^2*d^2*n^2 - 6*a*b*d^2*n - 3*a^2*d^2 +
3*(2*b^2*e^2*n^2 - 2*a*b*e^2*n + a^2*e^2)*x^2 + 3*(b^2*e^2*x^2 - b^2*d^2)*
log(c)^2 + 3*(b^2*e^2*n^2*x^2 + 2*b^2*d*e*n*x*log(c) - b^2*d^2*n^2 + 2*a*b
*d*e*n*x)*log(x)^2 - 6*(b^2*d^2*n + a*b*d^2 + (b^2*e^2*n - a*b*e^2)*x^2)*l
og(c) + 6*(b^2*d*e*x*log(c)^2 - b^2*d^2*n^2 - a*b*d^2*n + a^2*d*e*x - (b^2
*e^2*n^2 - a*b*e^2*n)*x^2 + (b^2*e^2*n*x^2 - b^2*d^2*n + 2*a*b*d*e*x)*log(
c))*log(x))/x
```

3.88.6 Sympy [A] (verification not implemented)

Time = 0.43 (sec) , antiderivative size = 255, normalized size of antiderivative = 1.92

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2}\,dx$$
$$= \begin{cases} -\frac{a^2d^2}{x} + \frac{2a^2de\log(cx^n)}{n} + a^2e^2x - \frac{2abd^2n}{x} - \frac{2abd^2\log(cx^n)}{x} + \frac{2abde\log(cx^n)^2}{n} - 2abe^2nx + 2abe^2x\log(cx^n) - \frac{2b^2 \cdots}{\cdots} \\ (a+b\log(c))^2\left(-\frac{d^2}{x} + 2de\log(x) + e^2x\right) \end{cases}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x**2,x)
```

output
```
Piecewise((-a**2*d**2/x + 2*a**2*d*e*log(c*x**n)/n + a**2*e**2*x - 2*a*b*d
**2*n/x - 2*a*b*d**2*log(c*x**n)/x + 2*a*b*d*e*log(c*x**n)**2/n - 2*a*b*e*
*2*n*x + 2*a*b*e**2*x*log(c*x**n) - 2*b**2*d**2*n**2/x - 2*b**2*d**2*n*log
(c*x**n)/x - b**2*d**2*log(c*x**n)**2/x + 2*b**2*d*e*log(c*x**n)**3/(3*n)
+ 2*b**2*e**2*n**2*x - 2*b**2*e**2*n*x*log(c*x**n) + b**2*e**2*x*log(c*x**
n)**2, Ne(n, 0)), ((a + b*log(c))**2*(-d**2/x + 2*d*e*log(x) + e**2*x), Tr
ue))
```

3.88.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 200, normalized size of antiderivative = 1.50

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2}\,dx = b^2e^2x\log(cx^n)^2 - 2\,abe^2nx + 2\,abe^2x\log(cx^n) + \frac{2\,b^2de\log(cx^n)^3}{3\,n} + 2\left(n^2x - nx\log(cx^n)\right)b^2e^2 - 2\,b^2d^2\left(\frac{n^2}{x} + \frac{n\log(cx^n)}{x}\right) + a^2e^2x + \frac{2\,abde\log(cx^n)^2}{n} - \frac{b^2d^2\log(cx^n)^2}{x} + 2\,a^2de\log(x) - \frac{2\,abd^2n}{x} - \frac{2\,abd^2\log(cx^n)}{x} - \frac{a^2d^2}{x}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^2,x, algorithm="maxima")
```

output
```
b^2*e^2*x*log(c*x^n)^2 - 2*a*b*e^2*n*x + 2*a*b*e^2*x*log(c*x^n) + 2/3*b^2*
d*e*log(c*x^n)^3/n + 2*(n^2*x - n*x*log(c*x^n))*b^2*e^2 - 2*b^2*d^2*(n^2/x
 + n*log(c*x^n)/x) + a^2*e^2*x + 2*a*b*d*e*log(c*x^n)^2/n - b^2*d^2*log(c*
x^n)^2/x + 2*a^2*d*e*log(x) - 2*a*b*d^2*n/x - 2*a*b*d^2*log(c*x^n)/x - a^2
*d^2/x
```

3.88.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 274 vs. 2(131) = 262.

Time = 0.36 (sec) , antiderivative size = 274, normalized size of antiderivative = 2.06

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2}\,dx = \frac{2}{3}\,b^2den^2\log(x)^3 + 2\,b^2den\log(c)\log(x)^2 + \left(x\log(x)^2 - 2\,x\log(x) + 2\,x\right)b^2e^2n^2 - b^2d^2n^2\left(\frac{\log(x)^2}{x} + \frac{2\,\log(x)}{x} + \frac{2}{x}\right) + 2\,(x\log(x) - x)b^2e^2n\log(c) - 2\,b^2d^2n\left(\frac{\log(x)}{x} + \frac{1}{x}\right)\log(c) + b^2e^2x\log(c)^2 + 2\,abden\log(x)^2 + 2\,b^2de\log(c)^2\log(|x|) + 2\,(x\log(x) - x)abe^2n - 2\,abd^2n\left(\frac{\log(x)}{x} + \frac{1}{x}\right) + 2\,abe^2x\log(c) + 4\,abde\log(c)\log(|x|) + a^2e^2x - \frac{b^2d^2\log(c)^2}{x} + 2\,a^2de\log(|x|) - \frac{2\,abd^2\log(c)}{x} - \frac{a^2d^2}{x}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^2,x, algorithm="giac")
```

output
```
2/3*b^2*d*e*n^2*log(x)^3 + 2*b^2*d*e*n*log(c)*log(x)^2 + (x*log(x)^2 - 2*x
*log(x) + 2*x)*b^2*e^2*n^2 - b^2*d^2*n^2*(log(x)^2/x + 2*log(x)/x + 2/x) +
 2*(x*log(x) - x)*b^2*e^2*n*log(c) - 2*b^2*d^2*n*(log(x)/x + 1/x)*log(c) +
 b^2*e^2*x*log(c)^2 + 2*a*b*d*e*n*log(x)^2 + 2*b^2*d*e*log(c)^2*log(abs(x)
) + 2*(x*log(x) - x)*a*b*e^2*n - 2*a*b*d^2*n*(log(x)/x + 1/x) + 2*a*b*e^2*
x*log(c) + 4*a*b*d*e*log(c)*log(abs(x)) + a^2*e^2*x - b^2*d^2*log(c)^2/x +
 2*a^2*d*e*log(abs(x)) - 2*a*b*d^2*log(c)/x - a^2*d^2/x
```

3.88.9 Mupad [B] (verification not implemented)

Time = 0.49 (sec) , antiderivative size = 228, normalized size of antiderivative = 1.71

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^2}\,dx = \ln(x)\,\left(2\,d\,e\,a^2 + 4\,d\,e\,a\,b\,n + 4\,d\,e\,b^2\,n^2\right) - \frac{a^2\,d^2 + 2\,a\,b\,d^2\,n + 2\,b^2\,d^2\,n^2}{x} - \ln(c\,x^n)\,\left(\frac{2\,b\,(a+b\,n)\,d^2 + 4\,b\,(a+b\,n)\,d\,e\,x + 2\,b\,(a-b\,n)\,e^2\,x^2}{x} - 4\,b\,e^2\,x\,(a-b\,n)\right) + \ln(c\,x^n)^2\left(2\,b^2\,e^2\,x - \frac{b^2\,d^2 + 2\,b^2\,d\,e\,x + b^2\,e^2\,x^2}{x} + \frac{2\,b\,d\,e\,(a+b\,n)}{n}\right) + e^2\,x\,\left(a^2 - 2\,a\,b\,n + 2\,b^2\,n^2\right) + \frac{2\,b^2\,d\,e\,\ln(c\,x^n)^3}{3\,n}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x^2,x)
```

output
```
log(x)*(2*a^2*d*e + 4*b^2*d*e*n^2 + 4*a*b*d*e*n) - (a^2*d^2 + 2*b^2*d^2*n^
2 + 2*a*b*d^2*n)/x - log(c*x^n)*((2*b*d^2*(a + b*n) + 2*b*e^2*x^2*(a - b*n
) + 4*b*d*e*x*(a + b*n))/x - 4*b*e^2*x*(a - b*n)) + log(c*x^n)^2*(2*b^2*e^
2*x - (b^2*d^2 + b^2*e^2*x^2 + 2*b^2*d*e*x)/x + (2*b*d*e*(a + b*n))/n) + e
^2*x*(a^2 + 2*b^2*n^2 - 2*a*b*n) + (2*b^2*d*e*log(c*x^n)^3)/(3*n)
```

3.88. $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^2}\,dx$

3.89 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^3}\,dx$

3.89.1 Optimal result

Integrand size = 23, antiderivative size = 137

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^3}\,dx = -\frac{b^2d^2n^2}{4x^2} - \frac{4b^2den^2}{x} - \frac{bd^2n(a+b\log(cx^n))}{2x^2} - \frac{4bden(a+b\log(cx^n))}{x} - \frac{d^2(a+b\log(cx^n))^2}{2x^2} - \frac{2de(a+b\log(cx^n))^2}{x} + \frac{e^2(a+b\log(cx^n))^3}{3bn}$$

output
```
-1/4*b^2*d^2*n^2/x^2-4*b^2*d*e*n^2/x-1/2*b*d^2*n*(a+b*ln(c*x^n))/x^2-4*b*d
*e*n*(a+b*ln(c*x^n))/x-1/2*d^2*(a+b*ln(c*x^n))^2/x^2-2*d*e*(a+b*ln(c*x^n))
^2/x+1/3*e^2*(a+b*ln(c*x^n))^3/b/n
```

3.89.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 117, normalized size of antiderivative = 0.85

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^3}\,dx = -\frac{d^2(a+b\log(cx^n))^2}{2x^2} - \frac{2de(a+b\log(cx^n))^2}{x} + \frac{e^2(a+b\log(cx^n))^3}{3bn} - \frac{4bden(a+bn+b\log(cx^n))}{x} - \frac{bd^2n(2a+bn+2b\log(cx^n))}{4x^2}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^3,x]
```

output
```
-1/2*(d^2*(a + b*Log[c*x^n])^2)/x^2 - (2*d*e*(a + b*Log[c*x^n])^2)/x + (e^
2*(a + b*Log[c*x^n])^3)/(3*b*n) - (4*b*d*e*n*(a + b*n + b*Log[c*x^n]))/x -
 (b*d^2*n*(2*a + b*n + 2*b*Log[c*x^n]))/(4*x^2)
```

3.89.3 Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^3} \, dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{x^3}+\frac{2de(a+b\log(cx^n))^2}{x^2}+\frac{e^2(a+b\log(cx^n))^2}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))^2}{2x^2}-\frac{bd^2n(a+b\log(cx^n))}{2x^2}-\frac{2de(a+b\log(cx^n))^2}{x}-\frac{4bden(a+b\log(cx^n))}{x}+\frac{e^2(a+b\log(cx^n))^3}{3bn}-\frac{b^2d^2n^2}{4x^2}-\frac{4b^2den^2}{x}$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^3,x]
```

output
```
-1/4*(b^2*d^2*n^2)/x^2 - (4*b^2*d*e*n^2)/x - (b*d^2*n*(a + b*Log[c*x^n]))/
(2*x^2) - (4*b*d*e*n*(a + b*Log[c*x^n]))/x - (d^2*(a + b*Log[c*x^n])^2)/(2
*x^2) - (2*d*e*(a + b*Log[c*x^n])^2)/x + (e^2*(a + b*Log[c*x^n])^3)/(3*b*n
)
```

3.89.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.89.4 Maple [A] (verified)

Time = 0.71 (sec) , antiderivative size = 217, normalized size of antiderivative = 1.58

method	result
parallelrisch	$\frac{4e^2b^2\ln(c\,x^n)^3x^2+12\ln(x)x^2a^2e^2n+12a\,e^2b\ln(c\,x^n)^2x^2-24x\ln(c\,x^n)^2b^2den-48x\ln(c\,x^n)b^2de\,n^2-48x\,b^2de\,n^3-48x\ln(c\,x^n}{12x^2n}$
risch	Expression too large to display

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^2/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/12/x^2*(4*e^2*b^2*ln(c*x^n)^3*x^2+12*ln(x)*x^2*a^2*e^2*n+12*a*e^2*b*ln(c
*x^n)^2*x^2-24*x*ln(c*x^n)^2*b^2*d*e*n-48*x*ln(c*x^n)*b^2*d*e*n^2-48*x*b^2
*d*e*n^3-48*x*ln(c*x^n)*a*b*d*e*n-48*x*a*b*d*e*n^2-6*ln(c*x^n)^2*b^2*d^2*n
-6*ln(c*x^n)*b^2*d^2*n^2-3*b^2*d^2*n^3-24*x*a^2*d*e*n-12*ln(c*x^n)*a*b*d^2
*n-6*a*b*d^2*n^2-6*a^2*d^2*n)/n
```

3.89.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 291 vs. 2(129) = 258.

Time = 0.31 (sec) , antiderivative size = 291, normalized size of antiderivative = 2.12

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))^2}{x^3}\,dx$$
$$= \frac{4\,b^2e^2n^2x^2\log(x)^3 - 3\,b^2d^2n^2 - 6\,abd^2n - 6\,a^2d^2 - 6\,(4\,b^2dex + b^2d^2)\log(c)^2 + 6\,(2\,b^2e^2nx^2\log(c) - 4\,b^2}{}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^3,x, algorithm="fricas")
```

output
```
1/12*(4*b^2*e^2*n^2*x^2*log(x)^3 - 3*b^2*d^2*n^2 - 6*a*b*d^2*n - 6*a^2*d^2
 - 6*(4*b^2*d*e*x + b^2*d^2)*log(c)^2 + 6*(2*b^2*e^2*n*x^2*log(c) - 4*b^2*
d*e*n^2*x + 2*a*b*e^2*n*x^2 - b^2*d^2*n^2)*log(x)^2 - 24*(2*b^2*d*e*n^2 +
2*a*b*d*e*n + a^2*d*e)*x - 6*(b^2*d^2*n + 2*a*b*d^2 + 8*(b^2*d*e*n + a*b*d
*e)*x)*log(c) + 6*(2*b^2*e^2*x^2*log(c)^2 - b^2*d^2*n^2 + 2*a^2*e^2*x^2 -
2*a*b*d^2*n - 8*(b^2*d*e*n^2 + a*b*d*e*n)*x - 2*(4*b^2*d*e*n*x - 2*a*b*e^2
*x^2 + b^2*d^2*n)*log(c))*log(x))/x^2
```

3.89.6 Sympy [A] (verification not implemented)

Time = 2.47 (sec) , antiderivative size = 258, normalized size of antiderivative = 1.88

$$\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^3}\,dx = -\frac{a^2d^2}{2x^2} - \frac{2a^2de}{x} + a^2e^2\log(x) - \frac{abd^2n}{2x^2} - \frac{abd^2\log(cx^n)}{x^2} - \frac{4abden}{x} - \frac{4abde\log(cx^n)}{x} - 2abe^2\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) - \frac{b^2d^2n^2}{4x^2} - \frac{b^2d^2n\log(cx^n)}{2x^2} - \frac{b^2d^2\log(cx^n)^2}{2x^2} - \frac{4b^2den^2}{x} - \frac{4b^2den\log(cx^n)}{x} - \frac{2b^2de\log(cx^n)^2}{x} - b^2e^2\left(\begin{cases} -\log(c)^2\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^3}{3n} & \text{otherwise} \end{cases}\right)$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x**3,x)
```

output
```
-a**2*d**2/(2*x**2) - 2*a**2*d*e/x + a**2*e**2*log(x) - a*b*d**2*n/(2*x**2
) - a*b*d**2*log(c*x**n)/x**2 - 4*a*b*d*e*n/x - 4*a*b*d*e*log(c*x**n)/x -
2*a*b*e**2*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), T
rue)) - b**2*d**2*n**2/(4*x**2) - b**2*d**2*n*log(c*x**n)/(2*x**2) - b**2*
d**2*log(c*x**n)**2/(2*x**2) - 4*b**2*d*e*n**2/x - 4*b**2*d*e*n*log(c*x**n
)/x - 2*b**2*d*e*log(c*x**n)**2/x - b**2*e**2*Piecewise((-log(c)**2*log(x)
, Eq(n, 0)), (-log(c*x**n)**3/(3*n), True))
```

3.89.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 210, normalized size of antiderivative = 1.53

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^3}\,dx = \frac{b^2e^2\log(cx^n)^3}{3n} - 4b^2de\left(\frac{n^2}{x}+\frac{n\log(cx^n)}{x}\right) - \frac{1}{4}b^2d^2\left(\frac{n^2}{x^2}+\frac{2n\log(cx^n)}{x^2}\right) + \frac{abe^2\log(cx^n)^2}{n} - \frac{2b^2de\log(cx^n)^2}{x} + a^2e^2\log(x) - \frac{4abden}{x} - \frac{4abde\log(cx^n)}{x} - \frac{b^2d^2\log(cx^n)^2}{2x^2} - \frac{abd^2n}{2x^2} - \frac{2a^2de}{x} - \frac{abd^2\log(cx^n)}{x^2} - \frac{a^2d^2}{2x^2}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^3,x, algorithm="maxima")
```

output
```
1/3*b^2*e^2*log(c*x^n)^3/n - 4*b^2*d*e*(n^2/x + n*log(c*x^n)/x) - 1/4*b^2*
d^2*(n^2/x^2 + 2*n*log(c*x^n)/x^2) + a*b*e^2*log(c*x^n)^2/n - 2*b^2*d*e*lo
g(c*x^n)^2/x + a^2*e^2*log(x) - 4*a*b*d*e*n/x - 4*a*b*d*e*log(c*x^n)/x - 1
/2*b^2*d^2*log(c*x^n)^2/x^2 - 1/2*a*b*d^2*n/x^2 - 2*a^2*d*e/x - a*b*d^2*lo
g(c*x^n)/x^2 - 1/2*a^2*d^2/x^2
```

3.89.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 290 vs. 2(129) = 258.

Time = 0.36 (sec) , antiderivative size = 290, normalized size of antiderivative = 2.12

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^3}\,dx = \frac{1}{3}b^2e^2n^2\log(x)^3 + b^2e^2n\log(c)\log(x)^2 - 2b^2den^2\left(\frac{\log(x)^2}{x} + \frac{2\log(x)}{x} + \frac{2}{x}\right) - \frac{1}{4}b^2d^2n^2\left(\frac{2\log(x)^2}{x^2} + \frac{2\log(x)}{x^2} + \frac{1}{x^2}\right) - 4b^2den\left(\frac{\log(x)}{x} + \frac{1}{x}\right)\log(c) - \frac{1}{2}b^2d^2n\left(\frac{2\log(x)}{x^2} + \frac{1}{x^2}\right)\log(c) + abe^2n\log(x)^2 + b^2e^2\log(c)^2\log(|x|) - 4abden\left(\frac{\log(x)}{x} + \frac{1}{x}\right) - \frac{1}{2}abd^2n\left(\frac{2\log(x)}{x^2} + \frac{1}{x^2}\right) + 2abe^2\log(c)\log(|x|) - \frac{2b^2de\log(c)^2}{x} + a^2e^2\log(|x|) - \frac{4abde\log(c)}{x} - \frac{b^2d^2\log(c)^2}{2x^2} - \frac{2a^2de}{x} - \frac{abd^2\log(c)}{x^2} - \frac{a^2d^2}{2x^2}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^3,x, algorithm="giac")
```

output
```
1/3*b^2*e^2*n^2*log(x)^3 + b^2*e^2*n*log(c)*log(x)^2 - 2*b^2*d*e*n^2*(log(
x)^2/x + 2*log(x)/x + 2/x) - 1/4*b^2*d^2*n^2*(2*log(x)^2/x^2 + 2*log(x)/x^
2 + 1/x^2) - 4*b^2*d*e*n*(log(x)/x + 1/x)*log(c) - 1/2*b^2*d^2*n*(2*log(x)
/x^2 + 1/x^2)*log(c) + a*b*e^2*n*log(x)^2 + b^2*e^2*log(c)^2*log(abs(x)) -
 4*a*b*d*e*n*(log(x)/x + 1/x) - 1/2*a*b*d^2*n*(2*log(x)/x^2 + 1/x^2) + 2*a
*b*e^2*log(c)*log(abs(x)) - 2*b^2*d*e*log(c)^2/x + a^2*e^2*log(abs(x)) - 4
*a*b*d*e*log(c)/x - 1/2*b^2*d^2*log(c)^2/x^2 - 2*a^2*d*e/x - a*b*d^2*log(c
)/x^2 - 1/2*a^2*d^2/x^2
```

3.89. $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^3}\,dx$

3.89.9 Mupad [B] (verification not implemented)

Time = 0.53 (sec) , antiderivative size = 221, normalized size of antiderivative = 1.61

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^3}\,dx$$
$$= \ln(x)\left(a^2 e^2 + 3\,a\,b\,e^2\,n + \frac{9\,b^2\,e^2\,n^2}{2}\right) - \frac{x\,(4\,d\,e\,a^2 + 8\,d\,e\,a\,b\,n + 8\,d\,e\,b^2\,n^2) + a^2\,d^2 + \frac{b^2\,d^2\,n^2}{2} + a\,b\,d^2\,n}{2\,x^2} - \ln(c\,x^n)^2\left(\frac{\frac{b^2\,d^2}{2} + 2\,b^2\,d\,e\,x + \frac{3\,b^2\,e^2\,x^2}{2}}{x^2} - \frac{b\,e^2\,(2\,a+3\,b\,n)}{2\,n}\right) - \frac{\ln(c\,x^n)\left(\frac{b\,(2\,a+b\,n)\,d^2}{2} + 4\,b\,(a+b\,n)\,d\,e\,x + \frac{3\,b\,(2\,a+3\,b\,n)\,e^2\,x^2}{2}\right)}{x^2} + \frac{b^2\,e^2\,\ln(c\,x^n)^3}{3\,n}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x^3,x)
```

output
```
log(x)*(a^2*e^2 + (9*b^2*e^2*n^2)/2 + 3*a*b*e^2*n) - (x*(4*a^2*d*e + 8*b^2
*d*e*n^2 + 8*a*b*d*e*n) + a^2*d^2 + (b^2*d^2*n^2)/2 + a*b*d^2*n)/(2*x^2) -
 log(c*x^n)^2*(((b^2*d^2)/2 + (3*b^2*e^2*x^2)/2 + 2*b^2*d*e*x)/x^2 - (b*e^
2*(2*a + 3*b*n))/(2*n)) - (log(c*x^n)*((b*d^2*(2*a + b*n))/2 + (3*b*e^2*x^
2*(2*a + 3*b*n))/2 + 4*b*d*e*x*(a + b*n)))/x^2 + (b^2*e^2*log(c*x^n)^3)/(3
*n)
```

3.90 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^4}\,dx$

3.90.1 Optimal result

Integrand size = 23, antiderivative size = 168

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4}\,dx = -\frac{2b^2d^2n^2}{27x^3} - \frac{b^2den^2}{2x^2} - \frac{2b^2e^2n^2}{x} - \frac{2bd^2n(a+b\log(cx^n))}{9x^3} - \frac{bden(a+b\log(cx^n))}{x^2} - \frac{2be^2n(a+b\log(cx^n))}{x} - \frac{d^2(a+b\log(cx^n))^2}{3x^3} - \frac{de(a+b\log(cx^n))^2}{x^2} - \frac{e^2(a+b\log(cx^n))^2}{x}$$

output
```
-2/27*b^2*d^2*n^2/x^3-1/2*b^2*d*e*n^2/x^2-2*b^2*e^2*n^2/x-2/9*b*d^2*n*(a+b
*ln(c*x^n))/x^3-b*d*e*n*(a+b*ln(c*x^n))/x^2-2*b*e^2*n*(a+b*ln(c*x^n))/x-1/
3*d^2*(a+b*ln(c*x^n))^2/x^3-d*e*(a+b*ln(c*x^n))^2/x^2-e^2*(a+b*ln(c*x^n))^
2/x
```

3.90.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 131, normalized size of antiderivative = 0.78

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4}\,dx = -\frac{18d^2(a+b\log(cx^n))^2 + 54dex(a+b\log(cx^n))^2 + 54e^2x^2(a+b\log(cx^n))^2 + 108be^2nx^2(a+bn+b\log}{54x^3}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^4,x]
```

output
```
-1/54*(18*d^2*(a + b*Log[c*x^n])^2 + 54*d*e*x*(a + b*Log[c*x^n])^2 + 54*e^
2*x^2*(a + b*Log[c*x^n])^2 + 108*b*e^2*n*x^2*(a + b*n + b*Log[c*x^n]) + 27
*b*d*e*n*x*(2*a + b*n + 2*b*Log[c*x^n]) + 4*b*d^2*n*(3*a + b*n + 3*b*Log[c
*x^n]))/x^3
```

3.90.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 168, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4} \, dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{x^4}+\frac{2de(a+b\log(cx^n))^2}{x^3}+\frac{e^2(a+b\log(cx^n))^2}{x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))^2}{3x^3}-\frac{2bd^2n(a+b\log(cx^n))}{9x^3}-\frac{de(a+b\log(cx^n))^2}{x^2}-\frac{bden(a+b\log(cx^n))}{x^2}-\frac{e^2(a+b\log(cx^n))^2}{x}-\frac{2be^2n(a+b\log(cx^n))}{x}-\frac{2b^2d^2n^2}{27x^3}-\frac{b^2den^2}{2x^2}-\frac{2b^2e^2n^2}{x}$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^4,x]
```

output
```
(-2*b^2*d^2*n^2)/(27*x^3) - (b^2*d*e*n^2)/(2*x^2) - (2*b^2*e^2*n^2)/x - (2
*b*d^2*n*(a + b*Log[c*x^n]))/(9*x^3) - (b*d*e*n*(a + b*Log[c*x^n]))/x^2 -
(2*b*e^2*n*(a + b*Log[c*x^n]))/x - (d^2*(a + b*Log[c*x^n])^2)/(3*x^3) - (d
*e*(a + b*Log[c*x^n])^2)/x^2 - (e^2*(a + b*Log[c*x^n])^2)/x
```

3.90.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.90.4 Maple [A] (verified)

Time = 0.72 (sec) , antiderivative size = 238, normalized size of antiderivative = 1.42

method	result
parallelrisch	$-\frac{54b^2\ln(c\,x^n)^2e^2x^2+108x^2\ln(c\,x^n)b^2e^2n+108b^2e^2n^2x^2+108ab\ln(c\,x^n)e^2x^2+108bn\,x^2a\,e^2+54b^2\ln(c\,x^n)^2dex+54b^2denx\ln}{}$
risch	Expression too large to display

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^2/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/54/x^3*(54*b^2*ln(c*x^n)^2*e^2*x^2+108*x^2*ln(c*x^n)*b^2*e^2*n+108*b^2*
e^2*n^2*x^2+108*a*b*ln(c*x^n)*e^2*x^2+108*b*n*x^2*a*e^2+54*b^2*ln(c*x^n)^2
*d*e*x+54*b^2*d*e*n*x*ln(c*x^n)+27*b^2*d*e*n^2*x+54*a^2*e^2*x^2+108*a*b*ln
(c*x^n)*d*e*x+54*a*b*d*e*n*x+18*b^2*ln(c*x^n)^2*d^2+12*ln(c*x^n)*n*b^2*d^2
+4*b^2*d^2*n^2+54*a^2*d*e*x+36*a*b*ln(c*x^n)*d^2+12*b*d^2*n*a+18*a^2*d^2)
```

3.90.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 326 vs. 2(160) = 320.

Time = 0.31 (sec) , antiderivative size = 326, normalized size of antiderivative = 1.94

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4}\,dx =$$
$$-\frac{4\,b^2d^2n^2+12\,abd^2n+18\,a^2d^2+54\,(2\,b^2e^2n^2+2\,abe^2n+a^2e^2)x^2+18\,(3\,b^2e^2x^2+3\,b^2dex+b^2d^2)\log(c}{}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^4,x, algorithm="fricas")
```

output
```
-1/54*(4*b^2*d^2*n^2 + 12*a*b*d^2*n + 18*a^2*d^2 + 54*(2*b^2*e^2*n^2 + 2*a
*b*e^2*n + a^2*e^2)*x^2 + 18*(3*b^2*e^2*x^2 + 3*b^2*d*e*x + b^2*d^2)*log(c
)^2 + 18*(3*b^2*e^2*n^2*x^2 + 3*b^2*d*e*n^2*x + b^2*d^2*n^2)*log(x)^2 + 27
*(b^2*d*e*n^2 + 2*a*b*d*e*n + 2*a^2*d*e)*x + 6*(2*b^2*d^2*n + 6*a*b*d^2 +
18*(b^2*e^2*n + a*b*e^2)*x^2 + 9*(b^2*d*e*n + 2*a*b*d*e)*x)*log(c) + 6*(2*
b^2*d^2*n^2 + 6*a*b*d^2*n + 18*(b^2*e^2*n^2 + a*b*e^2*n)*x^2 + 9*(b^2*d*e*
n^2 + 2*a*b*d*e*n)*x + 6*(3*b^2*e^2*n*x^2 + 3*b^2*d*e*n*x + b^2*d^2*n)*log
(c))*log(x))/x^3
```

3.90.6 Sympy [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 287, normalized size of antiderivative = 1.71

$$\begin{aligned}\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^4}\,dx = &-\frac{a^2d^2}{3x^3}-\frac{a^2de}{x^2}-\frac{a^2e^2}{x}-\frac{2abd^2n}{9x^3}-\frac{2abd^2\log(cx^n)}{3x^3}\\&-\frac{abden}{x^2}-\frac{2abde\log(cx^n)}{x^2}-\frac{2abe^2n}{x}-\frac{2abe^2\log(cx^n)}{x}\\&-\frac{2b^2d^2n^2}{27x^3}-\frac{2b^2d^2n\log(cx^n)}{9x^3}-\frac{b^2d^2\log(cx^n)^2}{3x^3}\\&-\frac{b^2den^2}{2x^2}-\frac{b^2den\log(cx^n)}{x^2}-\frac{b^2de\log(cx^n)^2}{x^2}\\&-\frac{2b^2e^2n^2}{x}-\frac{2b^2e^2n\log(cx^n)}{x}-\frac{b^2e^2\log(cx^n)^2}{x}\end{aligned}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x**4,x)
```

output
```
-a**2*d**2/(3*x**3) - a**2*d*e/x**2 - a**2*e**2/x - 2*a*b*d**2*n/(9*x**3)
- 2*a*b*d**2*log(c*x**n)/(3*x**3) - a*b*d*e*n/x**2 - 2*a*b*d*e*log(c*x**n)
/x**2 - 2*a*b*e**2*n/x - 2*a*b*e**2*log(c*x**n)/x - 2*b**2*d**2*n**2/(27*x
**3) - 2*b**2*d**2*n*log(c*x**n)/(9*x**3) - b**2*d**2*log(c*x**n)**2/(3*x*
*3) - b**2*d*e*n**2/(2*x**2) - b**2*d*e*n*log(c*x**n)/x**2 - b**2*d*e*log(
c*x**n)**2/x**2 - 2*b**2*e**2*n**2/x - 2*b**2*e**2*n*log(c*x**n)/x - b**2*
e**2*log(c*x**n)**2/x
```

3.90.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 250, normalized size of antiderivative = 1.49

$$\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^4}\,dx = -2\,b^2e^2\left(\frac{n^2}{x}+\frac{n\log(cx^n)}{x}\right) - \frac{1}{2}\,b^2de\left(\frac{n^2}{x^2}+\frac{2\,n\log(cx^n)}{x^2}\right) - \frac{2}{27}\,b^2d^2\left(\frac{n^2}{x^3}+\frac{3\,n\log(cx^n)}{x^3}\right) - \frac{b^2e^2\log(cx^n)^2}{x} - \frac{2\,abe^2n}{x} - \frac{2\,abe^2\log(cx^n)}{x} - \frac{b^2de\log(cx^n)^2}{x^2} - \frac{abden}{x^2} - \frac{a^2e^2}{x} - \frac{2\,abde\log(cx^n)}{x^2} - \frac{b^2d^2\log(cx^n)^2}{3\,x^3} - \frac{2\,abd^2n}{9\,x^3} - \frac{a^2de}{x^2} - \frac{2\,abd^2\log(cx^n)}{3\,x^3} - \frac{a^2d^2}{3\,x^3}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^4,x, algorithm="maxima")
```

output
```
-2*b^2*e^2*(n^2/x + n*log(c*x^n)/x) - 1/2*b^2*d*e*(n^2/x^2 + 2*n*log(c*x^n
)/x^2) - 2/27*b^2*d^2*(n^2/x^3 + 3*n*log(c*x^n)/x^3) - b^2*e^2*log(c*x^n)^
2/x - 2*a*b*e^2*n/x - 2*a*b*e^2*log(c*x^n)/x - b^2*d*e*log(c*x^n)^2/x^2 -
a*b*d*e*n/x^2 - a^2*e^2/x - 2*a*b*d*e*log(c*x^n)/x^2 - 1/3*b^2*d^2*log(c*x
^n)^2/x^3 - 2/9*a*b*d^2*n/x^3 - a^2*d*e/x^2 - 2/3*a*b*d^2*log(c*x^n)/x^3 -
 1/3*a^2*d^2/x^3
```

3.90.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 354 vs. 2(160) = 320.

Time = 0.36 (sec) , antiderivative size = 354, normalized size of antiderivative = 2.11

$$\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^4}\,dx = -\frac{(3\,b^2e^2n^2x^2+3\,b^2den^2x+b^2d^2n^2)\log(x)^2}{3\,x^3} - \frac{(18\,b^2e^2n^2x^2+18\,b^2e^2nx^2\log(c)+9\,b^2den^2x+18\,abe^2nx^2+18\,b^2denx\log(c)+2\,b^2d^2n^2+18\,abdenx}{9\,x^3} - \frac{108\,b^2e^2n^2x^2+108\,b^2e^2nx^2\log(c)+54\,b^2e^2x^2\log(c)^2+27\,b^2den^2x+108\,abe^2nx^2+54\,b^2denx\log(c)}{}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^4,x, algorithm="giac")
```

output
```
-1/3*(3*b^2*e^2*n^2*x^2 + 3*b^2*d*e*n^2*x + b^2*d^2*n^2)*log(x)^2/x^3 - 1/
9*(18*b^2*e^2*n^2*x^2 + 18*b^2*e^2*n*x^2*log(c) + 9*b^2*d*e*n^2*x + 18*a*b
*e^2*n*x^2 + 18*b^2*d*e*n*x*log(c) + 2*b^2*d^2*n^2 + 18*a*b*d*e*n*x + 6*b^
2*d^2*n*log(c) + 6*a*b*d^2*n)*log(x)/x^3 - 1/54*(108*b^2*e^2*n^2*x^2 + 108
*b^2*e^2*n*x^2*log(c) + 54*b^2*e^2*x^2*log(c)^2 + 27*b^2*d*e*n^2*x + 108*a
*b*e^2*n*x^2 + 54*b^2*d*e*n*x*log(c) + 108*a*b*e^2*x^2*log(c) + 54*b^2*d*e
*x*log(c)^2 + 4*b^2*d^2*n^2 + 54*a*b*d*e*n*x + 54*a^2*e^2*x^2 + 12*b^2*d^2
*n*log(c) + 108*a*b*d*e*x*log(c) + 18*b^2*d^2*log(c)^2 + 12*a*b*d^2*n + 54
*a^2*d*e*x + 36*a*b*d^2*log(c) + 18*a^2*d^2)/x^3
```

3.90.9 Mupad [B] (verification not implemented)

Time = 0.60 (sec) , antiderivative size = 184, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))^2}{x^4}\,dx =$$
$$-\frac{x\left(9\,d\,e\,a^2+9\,d\,e\,a\,b\,n+\frac{9\,d\,e\,b^2\,n^2}{2}\right)+x^2\,(9\,a^2\,e^2+18\,a\,b\,e^2\,n+18\,b^2\,e^2\,n^2)+3\,a^2\,d^2+\frac{2\,b^2\,d^2\,n^2}{3}+2\,a\,b\,d^2}{9\,x^3}$$
$$-\frac{\ln(c\,x^n)^2\,\left(\frac{b^2\,d^2}{3}+b^2\,d\,e\,x+b^2\,e^2\,x^2\right)}{x^3}$$
$$-\frac{\ln(c\,x^n)\,\left(\frac{2\,b\,(3\,a+b\,n)\,d^2}{3}+3\,b\,(2\,a+b\,n)\,d\,e\,x+6\,b\,(a+b\,n)\,e^2\,x^2\right)}{3\,x^3}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x^4,x)
```

output
```
- (x*(9*a^2*d*e + (9*b^2*d*e*n^2)/2 + 9*a*b*d*e*n) + x^2*(9*a^2*e^2 + 18*b
^2*e^2*n^2 + 18*a*b*e^2*n) + 3*a^2*d^2 + (2*b^2*d^2*n^2)/3 + 2*a*b*d^2*n)/
(9*x^3) - (log(c*x^n)^2*((b^2*d^2)/3 + b^2*e^2*x^2 + b^2*d*e*x))/x^3 - (lo
g(c*x^n)*((2*b*d^2*(3*a + b*n))/3 + 6*b*e^2*x^2*(a + b*n) + 3*b*d*e*x*(2*a
 + b*n)))/(3*x^3)
```

3.91 $\int \frac{(d+ex)^2(a+b\log(cx^n))^2}{x^5}\,dx$

3.91.1 Optimal result

Integrand size = 23, antiderivative size = 178

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))^2}{x^5}\,dx = -\frac{b^2d^2n^2}{32x^4}-\frac{4b^2den^2}{27x^3}-\frac{b^2e^2n^2}{4x^2} -\frac{bd^2n(a+b\log(cx^n))}{8x^4}-\frac{4bden(a+b\log(cx^n))}{9x^3} -\frac{be^2n(a+b\log(cx^n))}{2x^2}-\frac{d^2(a+b\log(cx^n))^2}{4x^4} -\frac{2de(a+b\log(cx^n))^2}{3x^3}-\frac{e^2(a+b\log(cx^n))^2}{2x^2}$$

output
```
-1/32*b^2*d^2*n^2/x^4-4/27*b^2*d*e*n^2/x^3-1/4*b^2*e^2*n^2/x^2-1/8*b*d^2*n
*(a+b*ln(c*x^n))/x^4-4/9*b*d*e*n*(a+b*ln(c*x^n))/x^3-1/2*b*e^2*n*(a+b*ln(c
*x^n))/x^2-1/4*d^2*(a+b*ln(c*x^n))^2/x^4-2/3*d*e*(a+b*ln(c*x^n))^2/x^3-1/2
*e^2*(a+b*ln(c*x^n))^2/x^2
```

3.91.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 134, normalized size of antiderivative = 0.75

$$\int \frac{(d+ex)^2\,(a+b\log(cx^n))^2}{x^5}\,dx = -\frac{216d^2(a+b\log(cx^n))^2+576dex(a+b\log(cx^n))^2+432e^2x^2(a+b\log(cx^n))^2+216be^2nx^2(2a+bn+}{864x^4}$$

input
```
Integrate[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^5,x]
```

output
```
-1/864*(216*d^2*(a + b*Log[c*x^n])^2 + 576*d*e*x*(a + b*Log[c*x^n])^2 + 43
2*e^2*x^2*(a + b*Log[c*x^n])^2 + 216*b*e^2*n*x^2*(2*a + b*n + 2*b*Log[c*x^
n]) + 128*b*d*e*n*x*(3*a + b*n + 3*b*Log[c*x^n]) + 27*b*d^2*n*(4*a + b*n +
 4*b*Log[c*x^n]))/x^4
```

3.91.3 Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 178, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^5} \, dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{x^5}+\frac{2de(a+b\log(cx^n))^2}{x^4}+\frac{e^2(a+b\log(cx^n))^2}{x^3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))^2}{4x^4}-\frac{bd^2n(a+b\log(cx^n))}{8x^4}-\frac{2de(a+b\log(cx^n))^2}{3x^3}-\frac{4bden(a+b\log(cx^n))}{9x^3}-\frac{e^2(a+b\log(cx^n))^2}{2x^2}-\frac{be^2n(a+b\log(cx^n))}{2x^2}-\frac{b^2d^2n^2}{32x^4}-\frac{4b^2den^2}{27x^3}-\frac{b^2e^2n^2}{4x^2}$$

input
```
Int[((d + e*x)^2*(a + b*Log[c*x^n])^2)/x^5,x]
```

output
```
-1/32*(b^2*d^2*n^2)/x^4 - (4*b^2*d*e*n^2)/(27*x^3) - (b^2*e^2*n^2)/(4*x^2)
 - (b*d^2*n*(a + b*Log[c*x^n]))/(8*x^4) - (4*b*d*e*n*(a + b*Log[c*x^n]))/(
9*x^3) - (b*e^2*n*(a + b*Log[c*x^n]))/(2*x^2) - (d^2*(a + b*Log[c*x^n])^2)
/(4*x^4) - (2*d*e*(a + b*Log[c*x^n])^2)/(3*x^3) - (e^2*(a + b*Log[c*x^n])^
2)/(2*x^2)
```

3.91.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.91.4 Maple [A] (verified)

Time = 0.50 (sec) , antiderivative size = 238, normalized size of antiderivative = 1.34

method	result
parallelrisch	$-\frac{432b^2\ln(c\,x^n)^2e^2x^2+432x^2\ln(c\,x^n)b^2e^2n+216b^2e^2n^2x^2+864ab\ln(c\,x^n)e^2x^2+432bn\,x^2a\,e^2+576b^2\ln(c\,x^n)^2dex+384b^2de\cdots}{}$
risch	Expression too large to display

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^2/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/864/x^4*(432*b^2*ln(c*x^n)^2*e^2*x^2+432*x^2*ln(c*x^n)*b^2*e^2*n+216*b^
2*e^2*n^2*x^2+864*a*b*ln(c*x^n)*e^2*x^2+432*b*n*x^2*a*e^2+576*b^2*ln(c*x^n
)^2*d*e*x+384*b^2*d*e*n*x*ln(c*x^n)+128*b^2*d*e*n^2*x+432*a^2*e^2*x^2+1152
*a*b*ln(c*x^n)*d*e*x+384*a*b*d*e*n*x+216*b^2*ln(c*x^n)^2*d^2+108*ln(c*x^n)
*n*b^2*d^2+27*b^2*d^2*n^2+576*a^2*d*e*x+432*a*b*ln(c*x^n)*d^2+108*b*d^2*n*
a+216*a^2*d^2)
```

3.91.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 332 vs. 2(160) = 320.

Time = 0.30 (sec) , antiderivative size = 332, normalized size of antiderivative = 1.87

$$\int \frac{(d+ex)^2\left(a+b\log\left(cx^n\right)\right)^2}{x^5}\,dx =$$
$$-\frac{27\,b^2d^2n^2+108\,abd^2n+216\,a^2d^2+216\,(b^2e^2n^2+2\,abe^2n+2\,a^2e^2)x^2+72\,(6\,b^2e^2x^2+8\,b^2dex+3\,b^2d^2\cdots}{}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^5,x, algorithm="fricas")
```

output
```
-1/864*(27*b^2*d^2*n^2 + 108*a*b*d^2*n + 216*a^2*d^2 + 216*(b^2*e^2*n^2 +
2*a*b*e^2*n + 2*a^2*e^2)*x^2 + 72*(6*b^2*e^2*x^2 + 8*b^2*d*e*x + 3*b^2*d^2
)*log(c)^2 + 72*(6*b^2*e^2*n^2*x^2 + 8*b^2*d*e*n^2*x + 3*b^2*d^2*n^2)*log(
x)^2 + 64*(2*b^2*d*e*n^2 + 6*a*b*d*e*n + 9*a^2*d*e)*x + 12*(9*b^2*d^2*n +
36*a*b*d^2 + 36*(b^2*e^2*n + 2*a*b*e^2)*x^2 + 32*(b^2*d*e*n + 3*a*b*d*e)*x
)*log(c) + 12*(9*b^2*d^2*n^2 + 36*a*b*d^2*n + 36*(b^2*e^2*n^2 + 2*a*b*e^2*
n)*x^2 + 32*(b^2*d*e*n^2 + 3*a*b*d*e*n)*x + 12*(6*b^2*e^2*n*x^2 + 8*b^2*d*
e*n*x + 3*b^2*d^2*n)*log(c))*log(x))/x^4
```

3.91.6 Sympy [A] (verification not implemented)

Time = 0.43 (sec) , antiderivative size = 309, normalized size of antiderivative = 1.74

$$\begin{aligned}\int \frac{(d+ex)^2\,(a+b\log{(cx^n)})^2}{x^5}\,dx = &-\frac{a^2d^2}{4x^4}-\frac{2a^2de}{3x^3}-\frac{a^2e^2}{2x^2}-\frac{abd^2n}{8x^4}-\frac{abd^2\log{(cx^n)}}{2x^4}\\&-\frac{4abden}{9x^3}-\frac{4abde\log{(cx^n)}}{3x^3}-\frac{abe^2n}{2x^2}-\frac{abe^2\log{(cx^n)}}{x^2}\\&-\frac{b^2d^2n^2}{32x^4}-\frac{b^2d^2n\log{(cx^n)}}{8x^4}-\frac{b^2d^2\log{(cx^n)}^2}{4x^4}\\&-\frac{4b^2den^2}{27x^3}-\frac{4b^2den\log{(cx^n)}}{9x^3}-\frac{2b^2de\log{(cx^n)}^2}{3x^3}\\&-\frac{b^2e^2n^2}{4x^2}-\frac{b^2e^2n\log{(cx^n)}}{2x^2}-\frac{b^2e^2\log{(cx^n)}^2}{2x^2}\end{aligned}$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**2/x**5,x)
```

output
```
-a**2*d**2/(4*x**4) - 2*a**2*d*e/(3*x**3) - a**2*e**2/(2*x**2) - a*b*d**2*
n/(8*x**4) - a*b*d**2*log(c*x**n)/(2*x**4) - 4*a*b*d*e*n/(9*x**3) - 4*a*b*
d*e*log(c*x**n)/(3*x**3) - a*b*e**2*n/(2*x**2) - a*b*e**2*log(c*x**n)/x**2
 - b**2*d**2*n**2/(32*x**4) - b**2*d**2*n*log(c*x**n)/(8*x**4) - b**2*d**2
*log(c*x**n)**2/(4*x**4) - 4*b**2*d*e*n**2/(27*x**3) - 4*b**2*d*e*n*log(c*
x**n)/(9*x**3) - 2*b**2*d*e*log(c*x**n)**2/(3*x**3) - b**2*e**2*n**2/(4*x*
*2) - b**2*e**2*n*log(c*x**n)/(2*x**2) - b**2*e**2*log(c*x**n)**2/(2*x**2)
```

3.91.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 251, normalized size of antiderivative = 1.41

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^5}\,dx = -\frac{1}{4}b^2e^2\left(\frac{n^2}{x^2}+\frac{2n\log(cx^n)}{x^2}\right) - \frac{4}{27}b^2de\left(\frac{n^2}{x^3}+\frac{3n\log(cx^n)}{x^3}\right) - \frac{1}{32}b^2d^2\left(\frac{n^2}{x^4}+\frac{4n\log(cx^n)}{x^4}\right) - \frac{b^2e^2\log(cx^n)^2}{2x^2} - \frac{abe^2n}{2x^2} - \frac{abe^2\log(cx^n)}{x^2} - \frac{2b^2de\log(cx^n)^2}{3x^3} - \frac{4abden}{9x^3} - \frac{a^2e^2}{2x^2} - \frac{4abde\log(cx^n)}{3x^3} - \frac{b^2d^2\log(cx^n)^2}{4x^4} - \frac{abd^2n}{8x^4} - \frac{2a^2de}{3x^3} - \frac{abd^2\log(cx^n)}{2x^4} - \frac{a^2d^2}{4x^4}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^5,x, algorithm="maxima")
```

output
```
-1/4*b^2*e^2*(n^2/x^2 + 2*n*log(c*x^n)/x^2) - 4/27*b^2*d*e*(n^2/x^3 + 3*n*
log(c*x^n)/x^3) - 1/32*b^2*d^2*(n^2/x^4 + 4*n*log(c*x^n)/x^4) - 1/2*b^2*e^
2*log(c*x^n)^2/x^2 - 1/2*a*b*e^2*n/x^2 - a*b*e^2*log(c*x^n)/x^2 - 2/3*b^2*
d*e*log(c*x^n)^2/x^3 - 4/9*a*b*d*e*n/x^3 - 1/2*a^2*e^2/x^2 - 4/3*a*b*d*e*l
og(c*x^n)/x^3 - 1/4*b^2*d^2*log(c*x^n)^2/x^4 - 1/8*a*b*d^2*n/x^4 - 2/3*a^2
*d*e/x^3 - 1/2*a*b*d^2*log(c*x^n)/x^4 - 1/4*a^2*d^2/x^4
```

3.91.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 355 vs. 2(160) = 320.

Time = 0.31 (sec) , antiderivative size = 355, normalized size of antiderivative = 1.99

$$\int \frac{(d+ex)^2 (a+b\log(cx^n))^2}{x^5}\,dx = -\frac{(6b^2e^2n^2x^2+8b^2den^2x+3b^2d^2n^2)\log(x)^2}{12x^4} - \frac{(36b^2e^2n^2x^2+72b^2e^2nx^2\log(c)+32b^2den^2x+72abe^2nx^2+96b^2denx\log(c)+9b^2d^2n^2+96abdenx}{72x^4} - \frac{216b^2e^2n^2x^2+432b^2e^2nx^2\log(c)+432b^2e^2x^2\log(c)^2+128b^2den^2x+432abe^2nx^2+384b^2denx\log(}{}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^2/x^5,x, algorithm="giac")
```

output
```
-1/12*(6*b^2*e^2*n^2*x^2 + 8*b^2*d*e*n^2*x + 3*b^2*d^2*n^2)*log(x)^2/x^4 -
 1/72*(36*b^2*e^2*n^2*x^2 + 72*b^2*e^2*n*x^2*log(c) + 32*b^2*d*e*n^2*x + 7
2*a*b*e^2*n*x^2 + 96*b^2*d*e*n*x*log(c) + 9*b^2*d^2*n^2 + 96*a*b*d*e*n*x +
 36*b^2*d^2*n*log(c) + 36*a*b*d^2*n)*log(x)/x^4 - 1/864*(216*b^2*e^2*n^2*x
^2 + 432*b^2*e^2*n*x^2*log(c) + 432*b^2*e^2*x^2*log(c)^2 + 128*b^2*d*e*n^2
*x + 432*a*b*e^2*n*x^2 + 384*b^2*d*e*n*x*log(c) + 864*a*b*e^2*x^2*log(c) +
 576*b^2*d*e*x*log(c)^2 + 27*b^2*d^2*n^2 + 384*a*b*d*e*n*x + 432*a^2*e^2*x
^2 + 108*b^2*d^2*n*log(c) + 1152*a*b*d*e*x*log(c) + 216*b^2*d^2*log(c)^2 +
 108*a*b*d^2*n + 576*a^2*d*e*x + 432*a*b*d^2*log(c) + 216*a^2*d^2)/x^4
```

3.91.9 Mupad [B] (verification not implemented)

Time = 0.62 (sec) , antiderivative size = 188, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex)^2 \left(a+b\log\left(cx^n\right)\right)^2}{x^5}\,dx =$$

$$-\frac{x\left(48\,d\,e\,a^2+32\,d\,e\,a\,b\,n+\frac{32\,d\,e\,b^2\,n^2}{3}\right)+x^2\left(36\,a^2\,e^2+36\,a\,b\,e^2\,n+18\,b^2\,e^2\,n^2\right)+18\,a^2\,d^2+\frac{9\,b^2\,d^2\,n^2}{4}+9}{72\,x^4}$$

$$-\frac{\ln\left(c\,x^n\right)^2\left(\frac{b^2\,d^2}{4}+\frac{2\,b^2\,d\,e\,x}{3}+\frac{b^2\,e^2\,x^2}{2}\right)}{x^4}$$

$$-\frac{\ln\left(c\,x^n\right)\left(\frac{3\,b\,(4\,a+b\,n)\,d^2}{4}+\frac{8\,b\,(3\,a+b\,n)\,d\,e\,x}{3}+3\,b\,(2\,a+b\,n)\,e^2\,x^2\right)}{6\,x^4}$$

input
```
int(((a + b*log(c*x^n))^2*(d + e*x)^2)/x^5,x)
```

output
```
- (x*(48*a^2*d*e + (32*b^2*d*e*n^2)/3 + 32*a*b*d*e*n) + x^2*(36*a^2*e^2 +
18*b^2*e^2*n^2 + 36*a*b*e^2*n) + 18*a^2*d^2 + (9*b^2*d^2*n^2)/4 + 9*a*b*d^
2*n)/(72*x^4) - (log(c*x^n)^2*((b^2*d^2)/4 + (b^2*e^2*x^2)/2 + (2*b^2*d*e*
x)/3))/x^4 - (log(c*x^n)*((3*b*d^2*(4*a + b*n))/4 + 3*b*e^2*x^2*(2*a + b*n
) + (8*b*d*e*x*(3*a + b*n))/3))/(6*x^4)
```

3.92 $\int \frac{x^3(a+b\log(cx^n))^2}{d+ex} dx$

3.92.1 Optimal result

Integrand size = 23, antiderivative size = 271

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx = &-\frac{2abd^2nx}{e^3}+\frac{2b^2d^2n^2x}{e^3}-\frac{b^2dn^2x^2}{4e^2}+\frac{2b^2n^2x^3}{27e}-\frac{2b^2d^2nx\log(cx^n)}{e^3}\\&+\frac{bdnx^2(a+b\log(cx^n))}{2e^2}-\frac{2bnx^3(a+b\log(cx^n))}{9e}\\&+\frac{d^2x(a+b\log(cx^n))^2}{e^3}-\frac{dx^2(a+b\log(cx^n))^2}{2e^2}\\&+\frac{x^3(a+b\log(cx^n))^2}{3e}-\frac{d^3(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^4}\\&-\frac{2bd^3n(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}\\&+\frac{2b^2d^3n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}\end{aligned}$$

output
```
-2*a*b*d^2*n*x/e^3+2*b^2*d^2*n^2*x/e^3-1/4*b^2*d*n^2*x^2/e^2+2/27*b^2*n^2*
x^3/e-2*b^2*d^2*n*x*ln(c*x^n)/e^3+1/2*b*d*n*x^2*(a+b*ln(c*x^n))/e^2-2/9*b*
n*x^3*(a+b*ln(c*x^n))/e+d^2*x*(a+b*ln(c*x^n))^2/e^3-1/2*d*x^2*(a+b*ln(c*x^
n))^2/e^2+1/3*x^3*(a+b*ln(c*x^n))^2/e-d^3*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^
4-2*b*d^3*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e^4+2*b^2*d^3*n^2*polylog(3,
-e*x/d)/e^4
```

3.92.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 211, normalized size of antiderivative = 0.78

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx =$$
$$-\frac{-108d^2ex(a+b\log(cx^n))^2+54de^2x^2(a+b\log(cx^n))^2-36e^3x^3(a+b\log(cx^n))^2+216bd^2enx(a-bn}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

output
```
-1/108*(-108*d^2*e*x*(a + b*Log[c*x^n])^2 + 54*d*e^2*x^2*(a + b*Log[c*x^n]
)^2 - 36*e^3*x^3*(a + b*Log[c*x^n])^2 + 216*b*d^2*e*n*x*(a - b*n + b*Log[c
*x^n]) - 8*b*e^3*n*x^3*(b*n - 3*(a + b*Log[c*x^n])) + 27*b*d*e^2*n*x^2*(b*
n - 2*(a + b*Log[c*x^n])) + 108*d^3*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d]
+ 216*b*d^3*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3,
-((e*x)/d)]))/e^4
```

3.92.3 Rubi [A] (verified)

Time = 0.50 (sec) , antiderivative size = 271, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx$$
$$\Big\downarrow \text{2795}$$
$$\int \left(-\frac{d^3(a+b\log(cx^n))^2}{e^3(d+ex)}+\frac{d^2(a+b\log(cx^n))^2}{e^3}-\frac{dx(a+b\log(cx^n))^2}{e^2}+\frac{x^2(a+b\log(cx^n))^2}{e}\right)dx$$
$$\Big\downarrow \text{2009}$$

$$-\frac{2bd^3n\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^4}-\frac{d^3\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^4}+\frac{d^2x(a+b\log(cx^n))^2}{e^3}-\frac{dx^2(a+b\log(cx^n))^2}{2e^2}+\frac{bdnx^2(a+b\log(cx^n))}{2e^2}+\frac{x^3(a+b\log(cx^n))^2}{3e}-\frac{2bnx^3(a+b\log(cx^n))}{9e}-\frac{2abd^2nx}{e^3}-\frac{2b^2d^2nx\log(cx^n)}{e^3}+\frac{2b^2d^3n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}+\frac{2b^2d^2n^2x}{e^3}-\frac{b^2dn^2x^2}{4e^2}+\frac{2b^2n^2x^3}{27e}$$

input
```
Int[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

output
```
(-2*a*b*d^2*n*x)/e^3 + (2*b^2*d^2*n^2*x)/e^3 - (b^2*d*n^2*x^2)/(4*e^2) + (
2*b^2*n^2*x^3)/(27*e) - (2*b^2*d^2*n*x*Log[c*x^n])/e^3 + (b*d*n*x^2*(a + b
*Log[c*x^n]))/(2*e^2) - (2*b*n*x^3*(a + b*Log[c*x^n]))/(9*e) + (d^2*x*(a +
 b*Log[c*x^n])^2)/e^3 - (d*x^2*(a + b*Log[c*x^n])^2)/(2*e^2) + (x^3*(a + b
*Log[c*x^n])^2)/(3*e) - (d^3*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^4 -
(2*b*d^3*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^4 + (2*b^2*d^3*n^2
*PolyLog[3, -((e*x)/d)])/e^4
```

3.92.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.92.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.57 (sec) , antiderivative size = 732, normalized size of antiderivative = 2.70

method	result
risch	$\frac{b^2\ln(x^n)^2x^3}{3e}-\frac{b^2\ln(x^n)^2d\,x^2}{2e^2}+\frac{b^2\ln(x^n)^2x\,d^2}{e^3}-\frac{b^2\ln(x^n)^2d^3\ln(ex+d)}{e^4}-\frac{2b^2n\ln(x^n)x^3}{9e}+\frac{b^2n\ln(x^n)d\,x^2}{2e^2}-\frac{2b^2n\ln(x^n)}{e^3}$

input
```
int(x^3*(a+b*ln(c*x^n))^2/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
1/3*b^2*ln(x^n)^2/e*x^3-1/2*b^2*ln(x^n)^2/e^2*d*x^2+b^2*ln(x^n)^2/e^3*x*d^
2-b^2*ln(x^n)^2*d^3/e^4*ln(e*x+d)-2/9*b^2*n*ln(x^n)/e*x^3+1/2*b^2*n*ln(x^n
)/e^2*d*x^2-2*b^2*n*ln(x^n)/e^3*x*d^2+2/27*b^2*n^2*x^3/e-1/4*b^2*d*n^2*x^2
/e^2+2*b^2*d^2*n^2*x/e^3-2*b^2*d^3/e^4*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-2*b^
2*d^3/e^4*ln(x)*dilog(-e*x/d)*n^2+2*b^2*n*d^3/e^4*ln(x^n)*ln(e*x+d)*ln(-e*
x/d)+2*b^2*n*d^3/e^4*ln(x^n)*dilog(-e*x/d)+b^2*d^3/e^4*n^2*ln(e*x+d)*ln(x)
^2-b^2*d^3/e^4*n^2*ln(x)^2*ln(1+e*x/d)-2*b^2*d^3/e^4*n^2*ln(x)*polylog(2,-
e*x/d)+2*b^2*d^3*n^2*polylog(3,-e*x/d)/e^4+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c
*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(1/3*ln(x^n)/e*x^3-1/2*ln(
x^n)/e^2*d*x^2+ln(x^n)/e^3*x*d^2-ln(x^n)*d^3/e^4*ln(e*x+d)-n*(1/6/e^4*(2/3
*(e*x+d)^3-7/2*d*(e*x+d)^2+11*d^2*(e*x+d))-d^3/e^4*(dilog(-e*x/d)+ln(e*x+d
)*ln(-e*x/d))))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*cs
gn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c
*x^n)^3+2*b*ln(c)+2*a)^2*(1/e^3*(1/3*e^2*x^3-1/2*d*e*x^2+d^2*x)-d^3/e^4*ln
(e*x+d))
```

3.92.5 Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2x^3}{ex+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*x^3*log(c*x^n)^2 + 2*a*b*x^3*log(c*x^n) + a^2*x^3)/(e*x + d)
, x)
```

3.92.6 Sympy [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))**2/(e*x+d),x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))**2/(d + e*x), x)
```

3.92.7 Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2x^3}{ex+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="maxima")
```

output
```
-1/6*a^2*(6*d^3*log(e*x + d)/e^4 - (2*e^2*x^3 - 3*d*e*x^2 + 6*d^2*x)/e^3)
+ integrate((b^2*x^3*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^3*log(x^n) + (b^2
*log(c)^2 + 2*a*b*log(c))*x^3)/(e*x + d), x)
```

3.92.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2x^3}{ex+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^3/(e*x + d), x)
```

3.92.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))^2}{d+e\,x}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x),x)
```

output
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x), x)
```

3.93 $\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx$

3.93.1 Optimal result

Integrand size = 23, antiderivative size = 200

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx &= \frac{2abdnx}{e^2}-\frac{2b^2dn^2x}{e^2}+\frac{b^2n^2x^2}{4e}+\frac{2b^2dnx\log(cx^n)}{e^2}\\ &\quad-\frac{bnx^2(a+b\log(cx^n))}{2e}-\frac{dx(a+b\log(cx^n))^2}{e^2}\\ &\quad+\frac{x^2(a+b\log(cx^n))^2}{2e}+\frac{d^2(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^3}\\ &\quad+\frac{2bd^2n(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}\\ &\quad-\frac{2b^2d^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}\end{aligned}$$

output
```
2*a*b*d*n*x/e^2-2*b^2*d*n^2*x/e^2+1/4*b^2*n^2*x^2/e+2*b^2*d*n*x*ln(c*x^n)/
e^2-1/2*b*n*x^2*(a+b*ln(c*x^n))/e-d*x*(a+b*ln(c*x^n))^2/e^2+1/2*x^2*(a+b*l
n(c*x^n))^2/e+d^2*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^3+2*b*d^2*n*(a+b*ln(c*x^
n))*polylog(2,-e*x/d)/e^3-2*b^2*d^2*n^2*polylog(3,-e*x/d)/e^3
```

3.93.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 158, normalized size of antiderivative = 0.79

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx$$
$$= \frac{-4dex(a+b\log(cx^n))^2+2e^2x^2(a+b\log(cx^n))^2+8bdenx(a-bn+b\log(cx^n))+be^2nx^2(bn-2(a+b\log(cx^n)))+\cdots}{\cdots}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

output
```
(-4*d*e*x*(a + b*Log[c*x^n])^2 + 2*e^2*x^2*(a + b*Log[c*x^n])^2 + 8*b*d*e*
n*x*(a - b*n + b*Log[c*x^n]) + b*e^2*n*x^2*(b*n - 2*(a + b*Log[c*x^n])) +
4*d^2*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 8*b*d^2*n*((a + b*Log[c*x^n]
)*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e*x)/d)]))/(4*e^3)
```

3.93.3 Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 200, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx$$
$$\Big\downarrow \; 2795$$
$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{e^2(d+ex)}-\frac{d(a+b\log(cx^n))^2}{e^2}+\frac{x(a+b\log(cx^n))^2}{e}\right)dx$$
$$\Big\downarrow \; 2009$$
$$\frac{2bd^2n\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^3}+\frac{d^2\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^3}-\frac{dx(a+b\log(cx^n))^2}{e^2}-\frac{bnx^2(a+b\log(cx^n))}{2e}+\frac{x^2(a+b\log(cx^n))^2}{2e}+\frac{2abdnx}{e^2}+\frac{2b^2dnx\log(cx^n)}{e^2}-\frac{2b^2d^2n^2\,\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}-\frac{2b^2dn^2x}{e^2}+\frac{b^2n^2x^2}{4e}$$

input
```
Int[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

output
```
(2*a*b*d*n*x)/e^2 - (2*b^2*d*n^2*x)/e^2 + (b^2*n^2*x^2)/(4*e) + (2*b^2*d*n
*x*Log[c*x^n])/e^2 - (b*n*x^2*(a + b*Log[c*x^n]))/(2*e) - (d*x*(a + b*Log[
c*x^n])^2)/e^2 + (x^2*(a + b*Log[c*x^n])^2)/(2*e) + (d^2*(a + b*Log[c*x^n]
)^2*Log[1 + (e*x)/d])/e^3 + (2*b*d^2*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*
x)/d)])/e^3 - (2*b^2*d^2*n^2*PolyLog[3, -((e*x)/d)])/e^3
```

3.93.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.93.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.49 (sec) , antiderivative size = 637, normalized size of antiderivative = 3.18

method	result
risch	$\frac{b^2 \ln(x^n)^2 x^2}{2e} - \frac{b^2 \ln(x^n)^2 dx}{e^2} + \frac{b^2 \ln(x^n)^2 d^2 \ln(ex+d)}{e^3} + \frac{2b^2 d^2 \ln(ex+d) \ln\left(-\frac{ex}{d}\right) \ln(x) n^2}{e^3} - \frac{2b^2 n\, d^2 \ln(x^n) \ln(ex+d) \ln\left(-\frac{ex}{d}\right)}{e^3}$

input
```
int(x^2*(a+b*ln(c*x^n))^2/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
1/2*b^2*ln(x^n)^2/e*x^2-b^2*ln(x^n)^2/e^2*d*x+b^2*ln(x^n)^2*d^2/e^3*ln(e*x
+d)+2*b^2*d^2/e^3*ln(e*x+d)*ln(-e*x/d)*ln(x)*n^2-2*b^2*n*d^2/e^3*ln(x^n)*l
n(e*x+d)*ln(-e*x/d)+2*b^2*d^2/e^3*dilog(-e*x/d)*ln(x)*n^2-2*b^2*n*d^2/e^3*
ln(x^n)*dilog(-e*x/d)-b^2*d^2/e^3*n^2*ln(e*x+d)*ln(x)^2+b^2*d^2/e^3*n^2*ln
(x)^2*ln(1+e*x/d)+2*b^2*d^2/e^3*n^2*ln(x)*polylog(2,-e*x/d)-2*b^2*d^2*n^2*
polylog(3,-e*x/d)/e^3-1/2*b^2*n*ln(x^n)/e*x^2+2*b^2*n*ln(x^n)/e^2*d*x+1/4*
b^2*n^2*x^2/e-2*b^2*d*n^2*x/e^2+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b
*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(1/2*ln(x^n)/e*x^2-ln(x^n)/e^2*d*x+ln
(x^n)*d^2/e^3*ln(e*x+d)-n*(d^2/e^3*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))+1/
2/e^3*(1/2*(e*x+d)^2-3*d*(e*x+d))))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^
n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(1/e^2*(1/2*e*x^2-d*x)+d^2/e^
3*ln(e*x+d))
```

3.93.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{ex+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*x^2*log(c*x^n)^2 + 2*a*b*x^2*log(c*x^n) + a^2*x^2)/(e*x + d)
, x)
```

3.93.6 Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))**2/(e*x+d),x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))**2/(d + e*x), x)
```

3.93.7 Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{ex+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="maxima")
```

output
```
1/2*a^2*(2*d^2*log(e*x + d)/e^3 + (e*x^2 - 2*d*x)/e^2) + integrate((b^2*x^
2*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^2*log(x^n) + (b^2*log(c)^2 + 2*a*b*l
og(c))*x^2)/(e*x + d), x)
```

3.93.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{ex+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^2/(e*x + d), x)
```

3.93.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))^2}{d+e\,x}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x),x)
```

output
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x), x)
```

3.94 $\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx$

3.94.1 Optimal result

Integrand size = 21, antiderivative size = 130

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx = -\frac{2abnx}{e}+\frac{2b^2n^2x}{e}-\frac{2b^2nx\log(cx^n)}{e}+\frac{x(a+b\log(cx^n))^2}{e}-\frac{d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^2}-\frac{2bdn(a+b\log(cx^n))\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}+\frac{2b^2dn^2\,\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^2}$$

output
```
-2*a*b*n*x/e+2*b^2*n^2*x/e-2*b^2*n*x*ln(c*x^n)/e+x*(a+b*ln(c*x^n))^2/e-d*(
a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^2-2*b*d*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)
/e^2+2*b^2*d*n^2*polylog(3,-e*x/d)/e^2
```

3.94.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 103, normalized size of antiderivative = 0.79

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx = \frac{ex(a+b\log(cx^n))^2-2benx(a-bn+b\log(cx^n))-d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)-2bdn\big((a+b\log(c$$
$$e^2$$

input
```
Integrate[(x*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

output
```
(e*x*(a + b*Log[c*x^n])^2 - 2*b*e*n*x*(a - b*n + b*Log[c*x^n]) - d*(a + b*
Log[c*x^n])^2*Log[1 + (e*x)/d] - 2*b*d*n*((a + b*Log[c*x^n])*PolyLog[2, -(
(e*x)/d)] - b*n*PolyLog[3, -((e*x)/d)]))/e^2
```

3.94.3 Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{(a+b\log(cx^n))^2}{e}-\frac{d(a+b\log(cx^n))^2}{e(d+ex)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2bdn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^2}-\frac{d\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^2}+\frac{x(a+b\log(cx^n))^2}{e}-\frac{2abnx}{e}-\frac{2b^2nx\log(cx^n)}{e}+\frac{2b^2dn^2\,\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^2}+\frac{2b^2n^2x}{e}$$

input
```
Int[(x*(a + b*Log[c*x^n])^2)/(d + e*x),x]
```

output
```
(-2*a*b*n*x)/e + (2*b^2*n^2*x)/e - (2*b^2*n*x*Log[c*x^n])/e + (x*(a + b*Lo
g[c*x^n])^2)/e - (d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^2 - (2*b*d*n*
(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^2 + (2*b^2*d*n^2*PolyLog[3, -
((e*x)/d)])/e^2
```

3.94.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.94.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.43 (sec) , antiderivative size = 528, normalized size of antiderivative = 4.06

method	result
risch	$\frac{b^2 \ln(x^n)^2 x}{e} - \frac{b^2 \ln(x^n)^2 d \ln(ex+d)}{e^2} - \frac{2b^2 n \ln(x^n) x}{e} + \frac{2b^2 n^2 x}{e} - \frac{2b^2 d \ln(ex+d) \ln(-\frac{ex}{d}) \ln(x) n^2}{e^2} + \frac{2b^2 nd \ln(x^n) \ln(ex+d) \ln}{e^2}$

input
```
int(x*(a+b*ln(c*x^n))^2/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2/e*x-b^2*ln(x^n)^2*d/e^2*ln(e*x+d)-2*b^2*n*ln(x^n)/e*x+2*b^2*
n^2*x/e-2*b^2*d/e^2*ln(e*x+d)*ln(-e*x/d)*ln(x)*n^2+2*b^2*n*d/e^2*ln(x^n)*l
n(e*x+d)*ln(-e*x/d)-2*b^2*d/e^2*dilog(-e*x/d)*ln(x)*n^2+2*b^2*n*d/e^2*ln(x
^n)*dilog(-e*x/d)+b^2*d/e^2*n^2*ln(e*x+d)*ln(x)^2-b^2*d/e^2*n^2*ln(x)^2*ln
(1+e*x/d)-2*b^2*d/e^2*n^2*ln(x)*polylog(2,-e*x/d)+2*b^2*d*n^2*polylog(3,-e
*x/d)/e^2+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*cs
gn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*
b*ln(c)+2*a)*b*(ln(x^n)/e*x-ln(x^n)*d/e^2*ln(e*x+d)-n*((e*x+d)/e^2-d/e^2*(
dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*
x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(x/e-d/e^2*ln(e*x+d))
```

3.94.5 Fricas [F]

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx=\int \frac{(b\log(cx^n)+a)^2x}{ex+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*x*log(c*x^n)^2 + 2*a*b*x*log(c*x^n) + a^2*x)/(e*x + d), x)
```

3.94.6 Sympy [F]

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx=\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))**2/(e*x+d),x)
```

output
```
Integral(x*(a + b*log(c*x**n))**2/(d + e*x), x)
```

3.94.7 Maxima [F]

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx=\int \frac{(b\log(cx^n)+a)^2x}{ex+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="maxima")
```

output
```
a^2*(x/e - d*log(e*x + d)/e^2) + integrate((b^2*x*log(x^n)^2 + 2*(b^2*log(
c) + a*b)*x*log(x^n) + (b^2*log(c)^2 + 2*a*b*log(c))*x)/(e*x + d), x)
```

3.94.8 Giac [F]

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{ex+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x/(e*x + d), x)
```

3.94.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))^2}{d+e\,x}\,dx$$

input
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x),x)
```

output
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x), x)
```

3.95 $\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx$

3.95.1 Optimal result

Integrand size = 20, antiderivative size = 72

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx = \frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e} + \frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e} - \frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e}$$

output
```
(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e+2*b*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e-
2*b^2*n^2*polylog(3,-e*x/d)/e
```

3.95.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 68, normalized size of antiderivative = 0.94

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx = \frac{(a+b\log(cx^n))^2\log\left(\frac{d+ex}{d}\right)}{e} - \frac{2bn\left(-\left((a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)\right)+bn\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)\right)}{e}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(d + e*x),x]
```

output
```
((a + b*Log[c*x^n])^2*Log[(d + e*x)/d])/e - (2*b*n*(-((a + b*Log[c*x^n])*P
olyLog[2, -((e*x)/d)]) + b*n*PolyLog[3, -((e*x)/d)]))/e
```

3.95.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 67, normalized size of antiderivative = 0.93, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.150, Rules used = {2754, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}dx$$

$$\Big\downarrow \ 2754$$

$$\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}$$

$$\Big\downarrow \ 2821$$

$$\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\left(bn\int \frac{\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{x}dx-\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))\right)}{e}$$

$$\Big\downarrow \ 7143$$

$$\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\left(bn\text{PolyLog}\left(3,-\frac{ex}{d}\right)-\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))\right)}{e}$$

input
```
Int[(a + b*Log[c*x^n])^2/(d + e*x),x]
```

output
```
((a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e - (2*b*n*(-((a + b*Log[c*x^n])*P
olyLog[2, -((e*x)/d)]) + b*n*PolyLog[3, -((e*x)/d)]))/e
```

3.95.3.1 Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.95.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.37 (sec) , antiderivative size = 445, normalized size of antiderivative = 6.18

method	result
risch	$\frac{b^2 \ln(x^n)^2 \ln(ex+d)}{e} + \frac{2b^2 n^2 \ln(x) \ln(ex+d) \ln(-\frac{ex}{d})}{e} + \frac{2b^2 n^2 \ln(x) \operatorname{dilog}(-\frac{ex}{d})}{e} - \frac{2b^2 n \ln(x^n) \ln(ex+d) \ln(-\frac{ex}{d})}{e} - \frac{2b^2 n \ln(x}{}$

input
```
int((a+b*ln(c*x^n))^2/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2*ln(e*x+d)/e+2*b^2/e*n^2*ln(x)*ln(e*x+d)*ln(-e*x/d)+2*b^2/e*n
^2*ln(x)*dilog(-e*x/d)-2*b^2/e*n*ln(x^n)*ln(e*x+d)*ln(-e*x/d)-2*b^2/e*n*ln
(x^n)*dilog(-e*x/d)-b^2/e*n^2*ln(e*x+d)*ln(x)^2+b^2/e*n^2*ln(x)^2*ln(1+e*x
/d)+2*b^2/e*n^2*ln(x)*polylog(2,-e*x/d)-2*b^2*n^2*polylog(3,-e*x/d)/e+(-I*
b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+
I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b
*(ln(x^n)*ln(e*x+d)/e-1/e*n*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d)))+1/4*(-I*
b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+
I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2
*ln(e*x+d)/e
```

3.95.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e*x + d), x)
```

3.95.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))**2/(d + e*x), x)
```

3.95.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d),x, algorithm="maxima")
```

output
```
a^2*log(e*x + d)/e + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(
c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e*x + d), x)
```

3.95.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)^2}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/(e*x + d), x)
```

3.95.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{d+ex}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{d+e\,x}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(d + e*x),x)
```

output
```
int((a + b*log(c*x^n))^2/(d + e*x), x)
```

3.96 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx$

3.96.1 Optimal result

Integrand size = 23, antiderivative size = 79

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx = -\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d} + \frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d} + \frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d}$$

output
```
-ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d+2*b*n*(a+b*ln(c*x^n))*polylog(2,-d/e/x)/d
+2*b^2*n^2*polylog(3,-d/e/x)/d
```

3.96.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.19

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx = \frac{(a+b\log(cx^n))^3}{3bdn} - \frac{(a+b\log(cx^n))^2\log\left(\frac{d+ex}{d}\right)}{d} - \frac{2bn\left((a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)-bn\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)\right)}{d}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x)),x]
```

output
```
(a + b*Log[c*x^n])^3/(3*b*d*n) - ((a + b*Log[c*x^n])^2*Log[(d + e*x)/d])/d
 - (2*b*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e
*x)/d)]))/d
```

3.96.3 Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 73, normalized size of antiderivative = 0.92, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2779, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx$$

$$\Big\downarrow \text{2779}$$

$$\frac{2bn\int \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}$$

$$\Big\downarrow \text{2821}$$

$$\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int \frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}$$

$$\Big\downarrow \text{7143}$$

$$\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x)),x]
```

output
```
-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*x^n])*
PolyLog[2, -(d/(e*x))] + b*n*PolyLog[3, -(d/(e*x))]))/d
```

3.96.3.1 Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.96.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.42 (sec) , antiderivative size = 528, normalized size of antiderivative = 6.68

method	result
risch	$-\frac{b^2 \ln(x^n)^2 \ln(ex+d)}{d}+\frac{b^2 \ln(x^n)^2 \ln(x)}{d}-\frac{b^2 n \ln(x^n) \ln(x)^2}{d}+\frac{b^2 \ln(x)^3 n^2}{3d}-\frac{2b^2 \ln(x) \ln(ex+d) \ln(-\frac{ex}{d}) n^2}{d}-\frac{2b^2 \ln(x) \mathrm{di}}{}$

input
```
int((a+b*ln(c*x^n))^2/x/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2/d*ln(e*x+d)+b^2*ln(x^n)^2/d*ln(x)-b^2*n/d*ln(x^n)*ln(x)^2+1
/3*b^2/d*ln(x)^3*n^2-2*b^2/d*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-2*b^2/d*ln(x)*
dilog(-e*x/d)*n^2+2*b^2*n/d*ln(x^n)*ln(e*x+d)*ln(-e*x/d)+2*b^2*n/d*ln(x^n)
*dilog(-e*x/d)+b^2/d*n^2*ln(e*x+d)*ln(x)^2-b^2/d*n^2*ln(x)^2*ln(1+e*x/d)-2
*b^2/d*n^2*ln(x)*polylog(2,-e*x/d)+2*b^2/d*n^2*polylog(3,-e*x/d)+(-I*b*Pi*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*P
i*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(-ln
(x^n)/d*ln(e*x+d)+ln(x^n)/d*ln(x)-n*(1/2/d*ln(x)^2-1/d*ln(e*x+d)*ln(-e*x/d
)-1/d*dilog(-e*x/d)))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b
*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*cs
gn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(-1/d*ln(e*x+d)+1/d*ln(x))
```

3.96.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e*x^2 + d*x), x)
```

3.96.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx = \int \frac{(a+b\log(cx^n))^2}{x\,(d+ex)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x*(d + e*x)), x)
```

3.96.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d),x, algorithm="maxima")
```

output
```
-a^2*(log(e*x + d)/d - log(x)/d) + integrate((b^2*log(c)^2 + b^2*log(x^n)^
2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e*x^2 + d*x), x)
```

3.96.8 Giac [F]

$$\int \frac{(a+b\log{(cx^n)})^2}{x(d+ex)}\,dx = \int \frac{(b\log{(cx^n)}+a)^2}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)*x), x)
```

3.96.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log{(cx^n)})^2}{x(d+ex)}\,dx = \int \frac{(a+b\,\ln{(c\,x^n)})^2}{x\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)), x)
```

3.97 $\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx$

3.97.1 Optimal result

Integrand size = 23, antiderivative size = 135

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = &-\frac{2b^2n^2}{dx}-\frac{2bn(a+b\log(cx^n))}{dx}-\frac{(a+b\log(cx^n))^2}{dx}\\ &+\frac{e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^2}\\ &-\frac{2ben(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2}\\ &-\frac{2b^2en^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^2}\end{aligned}$$

output
```
-2*b^2*n^2/d/x-2*b*n*(a+b*ln(c*x^n))/d/x-(a+b*ln(c*x^n))^2/d/x+e*ln(1+d/e/
x)*(a+b*ln(c*x^n))^2/d^2-2*b*e*n*(a+b*ln(c*x^n))*polylog(2,-d/e/x)/d^2-2*b
^2*e*n^2*polylog(3,-d/e/x)/d^2
```

3.97.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 130, normalized size of antiderivative = 0.96

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx =$$

$$-\frac{\frac{3d(a+b\log(cx^n))^2}{x}+\frac{e(a+b\log(cx^n))^3}{bn}+\frac{6bdn(a+bn+b\log(cx^n))}{x}-3e(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)-6ben\big((a+b\log \cdots}{3d^2}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)),x]
```

output
```
-1/3*((3*d*(a + b*Log[c*x^n])^2)/x + (e*(a + b*Log[c*x^n])^3)/(b*n) + (6*b
*d*n*(a + b*n + b*Log[c*x^n]))/x - 3*e*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/
d] - 6*b*e*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -
((e*x)/d)]))/d^2
```

3.97.3 Rubi [A] (verified)

Time = 0.76 (sec) , antiderivative size = 129, normalized size of antiderivative = 0.96, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2780, 2742, 2741, 2779, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x^2}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2742}$$

$$\frac{2bn\int \frac{a+b\log(cx^n)}{x^2}dx-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\int \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}\right)}{d}$$

$$\Big\downarrow \text{2821}$$

$$\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}\right)}{d}$$

$$\Big\downarrow \; 7143$$

$$\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)),x]
```

output
```
(-((a + b*Log[c*x^n])^2/x) + 2*b*n*(-((b*n)/x) - (a + b*Log[c*x^n])/x))/d
- (e*(-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*
x^n])*PolyLog[2, -(d/(e*x))] + b*n*PolyLog[3, -(d/(e*x))]))/d))/d
```

3.97.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2742
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Simp[b*n*
(p/(m + 1))   Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b
, c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.97.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.41 (sec) , antiderivative size = 615, normalized size of antiderivative = 4.56

method	result
risch	$\frac{b^2 \ln(x^n)^2 e \ln(ex+d)}{d^2} - \frac{b^2 \ln(x^n)^2}{dx} - \frac{b^2 \ln(x^n)^2 e \ln(x)}{d^2} + \frac{2b^2 e \ln(x) \ln(ex+d) \ln\left(-\frac{ex}{d}\right) n^2}{d^2} + \frac{2b^2 e \ln(x) \operatorname{dilog}\left(-\frac{ex}{d}\right) n^2}{d^2} - 2b^2 n$

input
```
int((a+b*ln(c*x^n))^2/x^2/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2*e/d^2*ln(e*x+d)-b^2*ln(x^n)^2/d/x-b^2*ln(x^n)^2*e/d^2*ln(x)+
2*b^2*e/d^2*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2+2*b^2*e/d^2*ln(x)*dilog(-e*x/d)
*n^2-2*b^2*n*e/d^2*ln(x^n)*ln(e*x+d)*ln(-e*x/d)-2*b^2*n*e/d^2*ln(x^n)*dilo
g(-e*x/d)-b^2*e/d^2*n^2*ln(e*x+d)*ln(x)^2+b^2*e/d^2*n^2*ln(x)^2*ln(1+e*x/d
)+2*b^2*e/d^2*n^2*ln(x)*polylog(2,-e*x/d)-2*b^2*e/d^2*n^2*polylog(3,-e*x/d
)-2*b^2*n*ln(x^n)/d/x-2*b^2*n^2/d/x+b^2*n*e/d^2*ln(x^n)*ln(x)^2-1/3*b^2*e/
d^2*ln(x)^3*n^2+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I
*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n
)^3+2*b*ln(c)+2*a)*b*(ln(x^n)*e/d^2*ln(e*x+d)-ln(x^n)/d/x-ln(x^n)*e/d^2*ln
(x)-n*(e/d^2*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))+1/d/x-1/2*e/d^2*ln(x)^2)
)+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I
*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln
(c)+2*a)^2*(e/d^2*ln(e*x+d)-1/d/x-e/d^2*ln(x))
```

3.97.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e*x^3 + d*x^2), x)
```

3.97.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = \int \frac{(a+b\log(cx^n))^2}{x^2\,(d+ex)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**2/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**2*(d + e*x)), x)
```

3.97.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d),x, algorithm="maxima")
```

output
```
a^2*(e*log(e*x + d)/d^2 - e*log(x)/d^2 - 1/(d*x)) + integrate((b^2*log(c)^
2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e*x^3
+ d*x^2), x)
```

3.97.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)*x^2), x)
```

3.97.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x^2\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)), x)
```

3.98 $\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx$

3.98.1 Optimal result

Integrand size = 23, antiderivative size = 204

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx =& -\frac{b^2n^2}{4dx^2}+\frac{2b^2en^2}{d^2x}-\frac{bn(a+b\log(cx^n))}{2dx^2}\\&+\frac{2ben(a+b\log(cx^n))}{d^2x}-\frac{(a+b\log(cx^n))^2}{2dx^2}\\&+\frac{e(a+b\log(cx^n))^2}{d^2x}-\frac{e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^3}\\&+\frac{2be^2n(a+b\log(cx^n))\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}\\&+\frac{2b^2e^2n^2\,\mathrm{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^3}\end{aligned}$$

output
```
-1/4*b^2*n^2/d/x^2+2*b^2*e*n^2/d^2/x-1/2*b*n*(a+b*ln(c*x^n))/d/x^2+2*b*e*n
*(a+b*ln(c*x^n))/d^2/x-1/2*(a+b*ln(c*x^n))^2/d/x^2+e*(a+b*ln(c*x^n))^2/d^2
/x-e^2*ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d^3+2*b*e^2*n*(a+b*ln(c*x^n))*polylog
(2,-d/e/x)/d^3+2*b^2*e^2*n^2*polylog(3,-d/e/x)/d^3
```

3.98.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 185, normalized size of antiderivative = 0.91

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = \frac{-\frac{6d^2(a+b\log(cx^n))^2}{x^2}+\frac{12de(a+b\log(cx^n))^2}{x}+\frac{4e^2(a+b\log(cx^n))^3}{bn}+\frac{24bden(a+bn+b\log(cx^n))}{x}-\frac{3bd^2n(2a+bn+2b\log(cx^n))}{x^2}-12e}{12d^3}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^3*(d + e*x)),x]
```

output
```
((-6*d^2*(a + b*Log[c*x^n])^2)/x^2 + (12*d*e*(a + b*Log[c*x^n])^2)/x + (4*
e^2*(a + b*Log[c*x^n])^3)/(b*n) + (24*b*d*e*n*(a + b*n + b*Log[c*x^n]))/x
- (3*b*d^2*n*(2*a + b*n + 2*b*Log[c*x^n]))/x^2 - 12*e^2*(a + b*Log[c*x^n])
^2*Log[1 + (e*x)/d] - 24*b*e^2*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)
] - b*n*PolyLog[3, -((e*x)/d)]))/(12*d^3)
```

3.98.3 Rubi [A] (verified)

Time = 1.11 (sec) , antiderivative size = 190, normalized size of antiderivative = 0.93, number of steps used = 9, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.391$, Rules used = {2780, 2742, 2741, 2780, 2742, 2741, 2779, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x^3}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2742}$$

$$\frac{bn\int \frac{a+b\log(cx^n)}{x^3}dx-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)}dx}{d}$$

$$\Big\downarrow \text{ 2780}$$

$$\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{\int\frac{(a+b\log(cx^n))^2}{x^2}dx}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{ 2742}$$

$$\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\int\frac{a+b\log(cx^n)}{x^2}dx-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{ 2741}$$

$$\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{ 2779}$$

$$\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\int\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{ 2821}$$

$$\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{ 7143}$$

3.98. $\int\frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx$

$$\frac{\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\left(\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}\right)}{d}\right)}{d}}{}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^3*(d + e*x)),x]
```

output
```
(-1/2*(a + b*Log[c*x^n])^2/x^2 + b*n*(-1/4*(b*n)/x^2 - (a + b*Log[c*x^n])/
(2*x^2)))/d - (e*((-((a + b*Log[c*x^n])^2/x) + 2*b*n*(-((b*n)/x) - (a + b*
Log[c*x^n])/x))/d - (e*(-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d) + (2*
b*n*((a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))] + b*n*PolyLog[3, -(d/(e*x))
]))/d))/d))/d
```

3.98.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2742
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Simp[b*n*
(p/(m + 1))   Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b
, c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.98.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.46 (sec) , antiderivative size = 731, normalized size of antiderivative = 3.58

method	result
risch	$-\frac{b^2 \ln(x^n)^2 e^2 \ln(ex+d)}{d^3} - \frac{b^2 \ln(x^n)^2}{2d\,x^2} + \frac{b^2 \ln(x^n)^2 e^2 \ln(x)}{d^3} + \frac{b^2 \ln(x^n)^2 e}{d^2 x} + \frac{2b^2 n \ln(x^n) e}{d^2 x} - \frac{b^2 n \ln(x^n)}{2d\,x^2} + \frac{2b^2 e\, n^2}{d^2 x} - \frac{b^2 n}{4d\,x}$

input
```
int((a+b*ln(c*x^n))^2/x^3/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2*e^2/d^3*ln(e*x+d)-1/2*b^2*ln(x^n)^2/d/x^2+b^2*ln(x^n)^2*e^2
/d^3*ln(x)+b^2*ln(x^n)^2*e/d^2/x+2*b^2*n*ln(x^n)*e/d^2/x-1/2*b^2*n*ln(x^n)
/d/x^2+2*b^2*e*n^2/d^2/x-1/4*b^2*n^2/d/x^2-b^2*n*e^2/d^3*ln(x^n)*ln(x)^2+1
/3*b^2*e^2/d^3*ln(x)^3*n^2-2*b^2*e^2/d^3*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-2*
b^2*e^2/d^3*ln(x)*dilog(-e*x/d)*n^2+2*b^2*n*e^2/d^3*ln(x^n)*ln(e*x+d)*ln(-
e*x/d)+2*b^2*n*e^2/d^3*ln(x^n)*dilog(-e*x/d)+b^2*e^2/d^3*n^2*ln(e*x+d)*ln(
x)^2-b^2*e^2/d^3*n^2*ln(x)^2*ln(1+e*x/d)-2*b^2*e^2/d^3*n^2*ln(x)*polylog(2
,-e*x/d)+2*b^2*e^2/d^3*n^2*polylog(3,-e*x/d)+(-I*b*Pi*csgn(I*c)*csgn(I*x^n
)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I
*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(-ln(x^n)*e^2/d^3*ln(e*x
+d)-1/2*ln(x^n)/d/x^2+ln(x^n)*e^2/d^3*ln(x)+ln(x^n)*e/d^2/x-1/2*n*(1/d^2*(
-2*e/x+1/2*d/x^2)+e^2/d^3*ln(x)^2-2*e^2/d^3*(dilog(-e*x/d)+ln(e*x+d)*ln(-e
*x/d))))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)
*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3
+2*b*ln(c)+2*a)^2*(-e^2/d^3*ln(e*x+d)-1/2/d/x^2+e^2/d^3*ln(x)+e/d^2/x)
```

3.98.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^3/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e*x^4 + d*x^3), x)
```

3.98.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = \int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**3/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**3*(d + e*x)), x)
```

3.98.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^3/(e*x+d),x, algorithm="maxima")
```

output
```
-1/2*a^2*(2*e^2*log(e*x + d)/d^3 - 2*e^2*log(x)/d^3 - (2*e*x - d)/(d^2*x^2
)) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(
c) + a*b)*log(x^n))/(e*x^4 + d*x^3), x)
```

3.98.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^3/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)*x^3), x)
```

3.98.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x^3\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^3*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^3*(d + e*x)), x)
```

3.99 $\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx$

3.99.1 Optimal result

Integrand size = 23, antiderivative size = 273

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx =& -\frac{2b^2n^2}{27dx^3}+\frac{b^2en^2}{4d^2x^2}-\frac{2b^2e^2n^2}{d^3x}-\frac{2bn(a+b\log(cx^n))}{9dx^3}\\ &+\frac{ben(a+b\log(cx^n))}{2d^2x^2}-\frac{2be^2n(a+b\log(cx^n))}{d^3x}\\ &-\frac{(a+b\log(cx^n))^2}{3dx^3}+\frac{e(a+b\log(cx^n))^2}{2d^2x^2}\\ &-\frac{e^2(a+b\log(cx^n))^2}{d^3x}+\frac{e^3\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^4}\\ &-\frac{2be^3n(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}\\ &-\frac{2b^2e^3n^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^4}\end{aligned}$$

output
```
-2/27*b^2*n^2/d/x^3+1/4*b^2*e*n^2/d^2/x^2-2*b^2*e^2*n^2/d^3/x-2/9*b*n*(a+b
*ln(c*x^n))/d/x^3+1/2*b*e*n*(a+b*ln(c*x^n))/d^2/x^2-2*b*e^2*n*(a+b*ln(c*x^
n))/d^3/x-1/3*(a+b*ln(c*x^n))^2/d/x^3+1/2*e*(a+b*ln(c*x^n))^2/d^2/x^2-e^2*
(a+b*ln(c*x^n))^2/d^3/x+e^3*ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d^4-2*b*e^3*n*(a
+b*ln(c*x^n))*polylog(2,-d/e/x)/d^4-2*b^2*e^3*n^2*polylog(3,-d/e/x)/d^4
```

3.99.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 237, normalized size of antiderivative = 0.87

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx$$
$$= \frac{-\frac{36d^3(a+b\log(cx^n))^2}{x^3}+\frac{54d^2e(a+b\log(cx^n))^2}{x^2}-\frac{108de^2(a+b\log(cx^n))^2}{x}-\frac{36e^3(a+b\log(cx^n))^3}{bn}-\frac{216bde^2n(a+bn+b\log(cx^n))}{x}+27b}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^4*(d + e*x)),x]
```

output
```
((-36*d^3*(a + b*Log[c*x^n])^2)/x^3 + (54*d^2*e*(a + b*Log[c*x^n])^2)/x^2
- (108*d*e^2*(a + b*Log[c*x^n])^2)/x - (36*e^3*(a + b*Log[c*x^n])^3)/(b*n)
 - (216*b*d*e^2*n*(a + b*n + b*Log[c*x^n]))/x + (27*b*d^2*e*n*(2*a + b*n +
 2*b*Log[c*x^n]))/x^2 - (8*b*d^3*n*(3*a + b*n + 3*b*Log[c*x^n]))/x^3 + 108
*e^3*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 216*b*e^3*n*((a + b*Log[c*x^n
])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e*x)/d)]))/(108*d^4)
```

3.99.3 Rubi [A] (verified)

Time = 1.51 (sec) , antiderivative size = 254, normalized size of antiderivative = 0.93, number of steps used = 12, number of rules used = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.522$, Rules used = {2780, 2742, 2741, 2780, 2742, 2741, 2780, 2742, 2741, 2779, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx$$
$$\Big\downarrow \; 2780$$
$$\frac{\int \frac{(a+b\log(cx^n))^2}{x^4}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}dx}{d}$$
$$\Big\downarrow \; 2742$$
$$\frac{\frac{2}{3}bn\int \frac{a+b\log(cx^n)}{x^4}dx-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)}dx}{d}$$
$$\Big\downarrow \; 2741$$

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x^3(d+ex)}dx}{d}$$

$\Big\downarrow$ 2780

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{\int\frac{(a+b\log(cx^n))^2}{x^3}dx}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x^2(d+ex)}dx}{d}\right)}{d}$$

$\Big\downarrow$ 2742

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\int\frac{a+b\log(cx^n)}{x^3}dx-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x^2(d+ex)}dx}{d}\right)}{d}$$

$\Big\downarrow$ 2741

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x^2(d+ex)}dx}{d}\right)}{d}$$

$\Big\downarrow$ 2780

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{\int\frac{(a+b\log(cx^n))^2}{x^2}dx}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}\right)}{d}\right)}{d}$$

$\Big\downarrow$ 2742

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\int\frac{a+b\log(cx^n)}{x^2}dx-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}\right)}{d}\right)}{d}$$

$\Big\downarrow$ 2741

3.99. $\int\frac{(a+b\log(cx^n))^2}{x^4(d+ex)}dx$

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}\right)}{d}\right)}{d}$$

$\downarrow$ 2779

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\int\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)\cdots}{\cdots}\right)}{d}\right)}{d}\right)}{d}$$

$\downarrow$ 2821

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{Poly}\cdots}{\cdots}\right)}{d}\cdots\right)}{d}\right)}{d}\right)}{d}$$

$\downarrow$ 7143

3.99. $\int\frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx$

$$\frac{\frac{2}{3}bn\left(-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}\right)-\frac{(a+b\log(cx^n))^2}{3x^3}}{d}-$$

$$\frac{e\left(\frac{bn\left(-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}\right)-\frac{(a+b\log(cx^n))^2}{2x^2}}{d}-\frac{e\left(\frac{2bn\left(-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}\right)-\frac{(a+b\log(cx^n))^2}{x}}{d}-\frac{e\left(\frac{2bn\left(\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\,\mathrm{PolyLo}\right.}{d}\right.}{d}\right.}{d}\right.}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^4*(d + e*x)),x]
```

output
```
(-1/3*(a + b*Log[c*x^n])^2/x^3 + (2*b*n*(-1/9*(b*n)/x^3 - (a + b*Log[c*x^n
])/(3*x^3)))/3)/d - (e*((-1/2*(a + b*Log[c*x^n])^2/x^2 + b*n*(-1/4*(b*n)/x
^2 - (a + b*Log[c*x^n])/(2*x^2)))/d - (e*((-((a + b*Log[c*x^n])^2/x) + 2*b
*n*(-((b*n)/x) - (a + b*Log[c*x^n])/x))/d - (e*(-((Log[1 + d/(e*x)]*(a + b
*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))] + b
*n*PolyLog[3, -(d/(e*x))]))/d))/d))/d))/d
```

3.99.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2742
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Simp[b*n*
(p/(m + 1))   Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b
, c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.99.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.53 (sec) , antiderivative size = 828, normalized size of antiderivative = 3.03

method	result
risch	$\frac{b^2 \ln(x^n)^2 e^3 \ln(ex+d)}{d^4} - \frac{b^2 \ln(x^n)^2}{3d\,x^3} - \frac{b^2 \ln(x^n)^2 e^2}{d^3 x} + \frac{b^2 \ln(x^n)^2 e}{2d^2 x^2} - \frac{b^2 \ln(x^n)^2 e^3 \ln(x)}{d^4} - \frac{2b^2 n \ln(x^n) e^2}{d^3 x} + \frac{b^2 n \ln(x^n) e}{2d^2 x^2} -$

input
```
int((a+b*ln(c*x^n))^2/x^4/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2*e^3/d^4*ln(e*x+d)-1/3*b^2*ln(x^n)^2/d/x^3-b^2*ln(x^n)^2*e^2/
d^3/x+1/2*b^2*ln(x^n)^2*e/d^2/x^2-b^2*ln(x^n)^2*e^3/d^4*ln(x)-2*b^2*n*ln(x
^n)*e^2/d^3/x+1/2*b^2*n*ln(x^n)*e/d^2/x^2-2/9*b^2*n*ln(x^n)/d/x^3-2*b^2*e^
2*n^2/d^3/x+1/4*b^2*e*n^2/d^2/x^2-2/27*b^2*n^2/d/x^3+b^2*n*e^3/d^4*ln(x^n)
*ln(x)^2-1/3*b^2*e^3/d^4*ln(x)^3*n^2+2*b^2*e^3/d^4*ln(x)*ln(e*x+d)*ln(-e*x
/d)*n^2+2*b^2*e^3/d^4*ln(x)*dilog(-e*x/d)*n^2-2*b^2*n*e^3/d^4*ln(x^n)*ln(e
*x+d)*ln(-e*x/d)-2*b^2*n*e^3/d^4*ln(x^n)*dilog(-e*x/d)-b^2*e^3/d^4*n^2*ln(
e*x+d)*ln(x)^2+b^2*e^3/d^4*n^2*ln(x)^2*ln(1+e*x/d)+2*b^2*e^3/d^4*n^2*ln(x)
*polylog(2,-e*x/d)-2*b^2*e^3/d^4*n^2*polylog(3,-e*x/d)+(-I*b*Pi*csgn(I*c)*
csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x
^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(ln(x^n)*e^3/d
^4*ln(e*x+d)-1/3*ln(x^n)/d/x^3-ln(x^n)*e^2/d^3/x+1/2*ln(x^n)*e/d^2/x^2-ln(
x^n)*e^3/d^4*ln(x)-1/6*n*(-1/d^3*(-6*e^2/x+3/2*d*e/x^2-2/3*d^2/x^3)-3*e^3/
d^4*ln(x)^2+6*e^3/d^4*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))))+1/4*(-I*b*Pi*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*P
i*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(e^3
/d^4*ln(e*x+d)-1/3/d/x^3-e^2/d^3/x+1/2*e/d^2/x^2-e^3/d^4*ln(x))
```

3.99.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^4/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e*x^5 + d*x^4), x)
```

3.99.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx = \int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**4/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**4*(d + e*x)), x)
```

3.99.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^4/(e*x+d),x, algorithm="maxima")
```

output
```
1/6*a^2*(6*e^3*log(e*x + d)/d^4 - 6*e^3*log(x)/d^4 - (6*e^2*x^2 - 3*d*e*x
+ 2*d^2)/(d^3*x^3)) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log
(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e*x^5 + d*x^4), x)
```

3.99.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^4/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)*x^4), x)
```

3.99.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^4(d+ex)}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x^4\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^4*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^4*(d + e*x)), x)
```

3.100 $\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2} dx$

3.100.1 Optimal result

Integrand size = 23, antiderivative size = 281

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2} dx &= \frac{4abdnx}{e^3} - \frac{4b^2dn^2x}{e^3} + \frac{b^2n^2x^2}{4e^2} + \frac{4b^2dnx\log(cx^n)}{e^3} \\ &\quad - \frac{bnx^2(a+b\log(cx^n))}{2e^2} - \frac{2dx(a+b\log(cx^n))^2}{e^3} \\ &\quad + \frac{x^2(a+b\log(cx^n))^2}{2e^2} - \frac{d^2x(a+b\log(cx^n))^2}{e^3(d+ex)} \\ &\quad + \frac{2bd^2n(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^4} \\ &\quad + \frac{3d^2(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^4} + \frac{2b^2d^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4} \\ &\quad + \frac{6bd^2n(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4} \\ &\quad - \frac{6b^2d^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}\end{aligned}$$

output
```
4*a*b*d*n*x/e^3-4*b^2*d*n^2*x/e^3+1/4*b^2*n^2*x^2/e^2+4*b^2*d*n*x*ln(c*x^n
)/e^3-1/2*b*n*x^2*(a+b*ln(c*x^n))/e^2-2*d*x*(a+b*ln(c*x^n))^2/e^3+1/2*x^2*
(a+b*ln(c*x^n))^2/e^2-d^2*x*(a+b*ln(c*x^n))^2/e^3/(e*x+d)+2*b*d^2*n*(a+b*l
n(c*x^n))*ln(1+e*x/d)/e^4+3*d^2*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^4+2*b^2*d^
2*n^2*polylog(2,-e*x/d)/e^4+6*b*d^2*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e^
4-6*b^2*d^2*n^2*polylog(3,-e*x/d)/e^4
```

3.100.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 240, normalized size of antiderivative = 0.85

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$
$$= \frac{-8dex(a+b\log(cx^n))^2+2e^2x^2(a+b\log(cx^n))^2+\frac{4d^3(a+b\log(cx^n))^2}{d+ex}+16bdenx(a-bn+b\log(cx^n))+be}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

output
```
(-8*d*e*x*(a + b*Log[c*x^n])^2 + 2*e^2*x^2*(a + b*Log[c*x^n])^2 + (4*d^3*(
a + b*Log[c*x^n])^2)/(d + e*x) + 16*b*d*e*n*x*(a - b*n + b*Log[c*x^n]) + b
*e^2*n*x^2*(b*n - 2*(a + b*Log[c*x^n])) + 12*d^2*(a + b*Log[c*x^n])^2*Log[
1 + (e*x)/d] + 4*d^2*(-((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1
 + (e*x)/d])) + 2*b^2*n^2*PolyLog[2, -((e*x)/d)]) + 24*b*d^2*n*((a + b*Log
[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -((e*x)/d)]))/(4*e^4)
```

3.100.3 Rubi [A] (verified)

Time = 0.52 (sec) , antiderivative size = 281, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$

$$\Big\downarrow \text{ 2795}$$

$$\int \left(-\frac{d^3(a+b\log(cx^n))^2}{e^3(d+ex)^2}+\frac{3d^2(a+b\log(cx^n))^2}{e^3(d+ex)}-\frac{2d(a+b\log(cx^n))^2}{e^3}+\frac{x(a+b\log(cx^n))^2}{e^2}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{6bd^2n\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^4}+\frac{2bd^2n\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^4}+\frac{3d^2\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^4}-\frac{d^2x(a+b\log(cx^n))^2}{e^3(d+ex)}-\frac{2dx(a+b\log(cx^n))^2}{e^3}-\frac{bnx^2(a+b\log(cx^n))}{2e^2}+\frac{x^2(a+b\log(cx^n))^2}{2e^2}+\frac{4abdnx}{e^3}+\frac{4b^2dnx\log(cx^n)}{e^3}+\frac{2b^2d^2n^2\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}-\frac{6b^2d^2n^2\,\mathrm{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}-\frac{4b^2dn^2x}{e^3}+\frac{b^2n^2x^2}{4e^2}$$

input
```
Int[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

output
```
(4*a*b*d*n*x)/e^3 - (4*b^2*d*n^2*x)/e^3 + (b^2*n^2*x^2)/(4*e^2) + (4*b^2*d
*n*x*Log[c*x^n])/e^3 - (b*n*x^2*(a + b*Log[c*x^n]))/(2*e^2) - (2*d*x*(a +
b*Log[c*x^n])^2)/e^3 + (x^2*(a + b*Log[c*x^n])^2)/(2*e^2) - (d^2*x*(a + b*
Log[c*x^n])^2)/(e^3*(d + e*x)) + (2*b*d^2*n*(a + b*Log[c*x^n])*Log[1 + (e*
x)/d])/e^4 + (3*d^2*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^4 + (2*b^2*d^
2*n^2*PolyLog[2, -((e*x)/d)])/e^4 + (6*b*d^2*n*(a + b*Log[c*x^n])*PolyLog[
2, -((e*x)/d)])/e^4 - (6*b^2*d^2*n^2*PolyLog[3, -((e*x)/d)])/e^4
```

3.100.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.100.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.55 (sec) , antiderivative size = 824, normalized size of antiderivative = 2.93

method	result	size
risch	Expression too large to display	824

input
```
int(x^3*(a+b*ln(c*x^n))^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b^2*ln(x^n)^2/e^2*x^2-2*b^2*ln(x^n)^2/e^3*d*x+3*b^2*ln(x^n)^2/e^4*d^2*
ln(e*x+d)+b^2*ln(x^n)^2*d^3/e^4/(e*x+d)+6*b^2/e^4*d^2*ln(x)*ln(e*x+d)*ln(-
e*x/d)*n^2+6*b^2/e^4*d^2*ln(x)*dilog(-e*x/d)*n^2-6*b^2*n/e^4*d^2*ln(x^n)*l
n(e*x+d)*ln(-e*x/d)-6*b^2*n/e^4*d^2*ln(x^n)*dilog(-e*x/d)-3*b^2/e^4*d^2*n^
2*ln(e*x+d)*ln(x)^2+3*b^2/e^4*d^2*n^2*ln(x)^2*ln(1+e*x/d)+6*b^2/e^4*d^2*n^
2*ln(x)*polylog(2,-e*x/d)-6*b^2*d^2*n^2*polylog(3,-e*x/d)/e^4-1/2*b^2*n*ln
(x^n)/e^2*x^2+4*b^2*n*ln(x^n)/e^3*d*x+2*b^2*n*ln(x^n)/e^4*d^2*ln(e*x+d)-2*
b^2*n/e^4*ln(x^n)*d^2*ln(x)+1/4*b^2*n^2*x^2/e^2-4*b^2*d*n^2*x/e^3+b^2/e^4*
n^2*d^2*ln(x)^2-2*b^2/e^4*n^2*ln(-e*x/d)*ln(e*x+d)*d^2-2*b^2/e^4*n^2*dilog
(-e*x/d)*d^2+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)
*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3
+2*b*ln(c)+2*a)*b*(1/2*ln(x^n)/e^2*x^2-2*ln(x^n)/e^3*d*x+3*ln(x^n)/e^4*d^2
*ln(e*x+d)+ln(x^n)*d^3/e^4/(e*x+d)-n*(3/e^4*d^2*(dilog(-e*x/d)+ln(e*x+d)*l
n(-e*x/d))+1/2/e^4*(1/2*(e*x+d)^2-5*d*(e*x+d)-2*d^2*ln(e*x+d)+2*d^2*ln(e*x
))))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csg
n(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b
*ln(c)+2*a)^2*(1/e^3*(1/2*e*x^2-2*d*x)+3/e^4*d^2*ln(e*x+d)+d^3/e^4/(e*x+d)
)
```

3.100.5 Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx=\int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*x^3*log(c*x^n)^2 + 2*a*b*x^3*log(c*x^n) + a^2*x^3)/(e^2*x^2
+ 2*d*e*x + d^2), x)
```

3.100.6 Sympy [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2} dx = \int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2} dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))**2/(e*x+d)**2,x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))**2/(d + e*x)**2, x)
```

3.100.7 Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2} dx = \int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^2} dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="maxima")
```

output
```
1/2*(2*d^3/(e^5*x + d*e^4) + 6*d^2*log(e*x + d)/e^4 + (e*x^2 - 4*d*x)/e^3)
*a^2 + integrate((b^2*x^3*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^3*log(x^n) +
 (b^2*log(c)^2 + 2*a*b*log(c))*x^3)/(e^2*x^2 + 2*d*e*x + d^2), x)
```

3.100.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2} dx = \int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^2} dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^3/(e*x + d)^2, x)
```

3.100.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^2}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^2,x)
```

output
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^2, x)
```

3.101 $\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$

3.101.1 Optimal result

Integrand size = 23, antiderivative size = 203

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = -\frac{2abnx}{e^2}+\frac{2b^2n^2x}{e^2}-\frac{2b^2nx\log(cx^n)}{e^2}+\frac{x(a+b\log(cx^n))^2}{e^2}+\frac{dx(a+b\log(cx^n))^2}{e^2(d+ex)}-\frac{2bdn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3}-\frac{2d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^3}-\frac{2b^2dn^2\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}-\frac{4bdn(a+b\log(cx^n))\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{4b^2dn^2\,\mathrm{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}$$

output

```
-2*a*b*n*x/e^2+2*b^2*n^2*x/e^2-2*b^2*n*x*ln(c*x^n)/e^2+x*(a+b*ln(c*x^n))^2
/e^2+d*x*(a+b*ln(c*x^n))^2/e^2/(e*x+d)-2*b*d*n*(a+b*ln(c*x^n))*ln(1+e*x/d)
/e^3-2*d*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^3-2*b^2*d*n^2*polylog(2,-e*x/d)/e
^3-4*b*d*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e^3+4*b^2*d*n^2*polylog(3,-e*
x/d)/e^3
```

3.101.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 186, normalized size of antiderivative = 0.92

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$
$$= \frac{d(a+b\log(cx^n))^2+ex(a+b\log(cx^n))^2-\frac{d^2(a+b\log(cx^n))^2}{d+ex}-2benx(a-bn+b\log(cx^n))-2bdn(a+b\log}{}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

output
```
(d*(a + b*Log[c*x^n])^2 + e*x*(a + b*Log[c*x^n])^2 - (d^2*(a + b*Log[c*x^n
])^2)/(d + e*x) - 2*b*e*n*x*(a - b*n + b*Log[c*x^n]) - 2*b*d*n*(a + b*Log[
c*x^n])*Log[1 + (e*x)/d] - 2*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] - 2*b
^2*d*n^2*PolyLog[2, -((e*x)/d)] - 4*b*d*n*(a + b*Log[c*x^n])*PolyLog[2, -(
(e*x)/d)] + 4*b^2*d*n^2*PolyLog[3, -((e*x)/d)])/e^3
```

3.101.3 Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 203, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$
$$\Big\downarrow \text{2795}$$
$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{e^2(d+ex)^2}-\frac{2d(a+b\log(cx^n))^2}{e^2(d+ex)}+\frac{(a+b\log(cx^n))^2}{e^2}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$-\frac{4bdn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^3}-\frac{2bdn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^3}-\frac{2d\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^3}+\frac{dx(a+b\log(cx^n))^2}{e^2(d+ex)}+\frac{x(a+b\log(cx^n))^2}{e^2}-\frac{2abnx}{e^2}-\frac{2b^2nx\log(cx^n)}{e^2}-\frac{2b^2dn^2\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}+\frac{4b^2dn^2\,\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}+\frac{2b^2n^2x}{e^2}$$

input
```
Int[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

output
```
(-2*a*b*n*x)/e^2 + (2*b^2*n^2*x)/e^2 - (2*b^2*n*x*Log[c*x^n])/e^2 + (x*(a
+ b*Log[c*x^n])^2)/e^2 + (d*x*(a + b*Log[c*x^n])^2)/(e^2*(d + e*x)) - (2*b
*d*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e^3 - (2*d*(a + b*Log[c*x^n])^2*
Log[1 + (e*x)/d])/e^3 - (2*b^2*d*n^2*PolyLog[2, -((e*x)/d)])/e^3 - (4*b*d*
n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^3 + (4*b^2*d*n^2*PolyLog[3,
 -((e*x)/d)])/e^3
```

3.101.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.101.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.51 (sec) , antiderivative size = 700, normalized size of antiderivative = 3.45

method	result
risch	$\frac{b^2 \ln(x^n)^2 x}{e^2} - \frac{2b^2 \ln(x^n)^2 d \ln(ex+d)}{e^3} - \frac{b^2 \ln(x^n)^2 d^2}{e^3(ex+d)} + \frac{2b^2 n \ln(x) \ln(x^n) d}{e^3} - \frac{2b^2 n \ln(x^n) d \ln(ex+d)}{e^3} - \frac{2b^2 n \ln(x^n) x}{e^2} + \frac{2b^2}{e}$

input
```
int(x^2*(a+b*ln(c*x^n))^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2/e^2*x-2*b^2*ln(x^n)^2/e^3*d*ln(e*x+d)-b^2*ln(x^n)^2/e^3*d^2/
(e*x+d)+2*b^2*n/e^3*ln(x)*ln(x^n)*d-2*b^2*n*ln(x^n)/e^3*d*ln(e*x+d)-2*b^2*
n*ln(x^n)/e^2*x+2*b^2*n^2*x/e^2+2*b^2/e^3*n^2*ln(e*x+d)*ln(-e*x/d)*d+2*b^2
/e^3*n^2*dilog(-e*x/d)*d-b^2/e^3*n^2*d*ln(x)^2-4*b^2/e^3*d*ln(x)*ln(e*x+d)
*ln(-e*x/d)*n^2-4*b^2/e^3*d*ln(x)*dilog(-e*x/d)*n^2+4*b^2*n/e^3*d*ln(x^n)*
ln(e*x+d)*ln(-e*x/d)+4*b^2*n/e^3*d*ln(x^n)*dilog(-e*x/d)+2*b^2/e^3*d*n^2*l
n(e*x+d)*ln(x)^2-2*b^2/e^3*d*n^2*ln(x)^2*ln(1+e*x/d)-4*b^2/e^3*d*n^2*ln(x)
*polylog(2,-e*x/d)+4*b^2*d*n^2*polylog(3,-e*x/d)/e^3+(-I*b*Pi*csgn(I*c)*cs
gn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n
)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(ln(x^n)/e^2*x-2
*ln(x^n)/e^3*d*ln(e*x+d)-ln(x^n)/e^3*d^2/(e*x+d)-n*(1/e^3*(e*x+d+d*ln(e*x+
d)-d*ln(e*x))-2/e^3*d*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))))+1/4*(-I*b*Pi*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*P
i*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(x/e
^2-2/e^3*d*ln(e*x+d)-1/e^3*d^2/(e*x+d))
```

3.101.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*x^2*log(c*x^n)^2 + 2*a*b*x^2*log(c*x^n) + a^2*x^2)/(e^2*x^2
+ 2*d*e*x + d^2), x)
```

3.101.6 Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))**2/(e*x+d)**2,x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))**2/(d + e*x)**2, x)
```

3.101.7 Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="maxima")
```

output
```
-a^2*(d^2/(e^4*x + d*e^3) - x/e^2 + 2*d*log(e*x + d)/e^3) + integrate((b^2
*x^2*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^2*log(x^n) + (b^2*log(c)^2 + 2*a*
b*log(c))*x^2)/(e^2*x^2 + 2*d*e*x + d^2), x)
```

3.101.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^2/(e*x + d)^2, x)
```

3.101.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^2}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^2,x)
```

output
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^2, x)
```

3.102 $\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$

3.102.1 Optimal result

Integrand size = 21, antiderivative size = 143

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = -\frac{x(a+b\log(cx^n))^2}{e(d+ex)}+\frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^2}+\frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^2}+\frac{2b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}+\frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^2}$$

output
```
-x*(a+b*ln(c*x^n))^2/e/(e*x+d)+2*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^2+(a+b*
ln(c*x^n))^2*ln(1+e*x/d)/e^2+2*b^2*n^2*polylog(2,-e*x/d)/e^2+2*b*n*(a+b*ln
(c*x^n))*polylog(2,-e*x/d)/e^2-2*b^2*n^2*polylog(3,-e*x/d)/e^2
```

3.102.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 142, normalized size of antiderivative = 0.99

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \frac{-(a+b\log(cx^n))^2+\frac{d(a+b\log(cx^n))^2}{d+ex}+2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)+(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)+}{e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

output
```
(-(a + b*Log[c*x^n])^2 + (d*(a + b*Log[c*x^n])^2)/(d + e*x) + 2*b*n*(a + b
*Log[c*x^n])*Log[1 + (e*x)/d] + (a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 2*
b^2*n^2*PolyLog[2, -((e*x)/d)] + 2*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*
x)/d)] - 2*b^2*n^2*PolyLog[3, -((e*x)/d)])/e^2
```

3.102.3 Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{(a+b\log(cx^n))^2}{e(d+ex)}-\frac{d(a+b\log(cx^n))^2}{e(d+ex)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{2bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^2}+\frac{2bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^2}+\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^2}-\frac{x(a+b\log(cx^n))^2}{e(d+ex)}+\frac{2b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^2}-\frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^2}$$

input
```
Int[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^2,x]
```

output
```
-((x*(a + b*Log[c*x^n])^2)/(e*(d + e*x))) + (2*b*n*(a + b*Log[c*x^n])*Log[
1 + (e*x)/d])/e^2 + ((a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^2 + (2*b^2*n
^2*PolyLog[2, -((e*x)/d)])/e^2 + (2*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e
*x)/d)])/e^2 - (2*b^2*n^2*PolyLog[3, -((e*x)/d)])/e^2
```

3.102.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.102.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.42 (sec) , antiderivative size = 609, normalized size of antiderivative = 4.26

method	result
risch	$\frac{b^2\ln(x^n)^2\ln(ex+d)}{e^2}+\frac{b^2\ln(x^n)^2 d}{e^2(ex+d)}+\frac{2b^2\ln(x)\ln(ex+d)\ln\left(-\frac{ex}{d}\right)n^2}{e^2}+\frac{2b^2\ln(x)\operatorname{dilog}\left(-\frac{ex}{d}\right)n^2}{e^2}-\frac{2b^2 n\ln(x^n)\ln(ex+d)\ln\left(-\frac{e}{}\right.}{e^2}$

input
```
int(x*(a+b*ln(c*x^n))^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2/e^2*ln(e*x+d)+b^2*ln(x^n)^2/e^2*d/(e*x+d)+2*b^2/e^2*ln(x)*ln
(e*x+d)*ln(-e*x/d)*n^2+2*b^2/e^2*ln(x)*dilog(-e*x/d)*n^2-2*b^2*n/e^2*ln(x^
n)*ln(e*x+d)*ln(-e*x/d)-2*b^2*n/e^2*ln(x^n)*dilog(-e*x/d)-b^2/e^2*n^2*ln(e
*x+d)*ln(x)^2+b^2/e^2*n^2*ln(x)^2*ln(1+e*x/d)+2*b^2/e^2*n^2*ln(x)*polylog(
2,-e*x/d)-2*b^2*n^2*polylog(3,-e*x/d)/e^2+2*b^2*n*ln(x^n)/e^2*ln(e*x+d)-2*
b^2*n/e^2*ln(x^n)*ln(x)+b^2/e^2*n^2*ln(x)^2-2*b^2/e^2*n^2*ln(e*x+d)*ln(-e*
x/d)-2*b^2/e^2*n^2*dilog(-e*x/d)+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x
^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*
b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(ln(x^n)/e^2*ln(e*x+d)+ln(x^n)/e^2*d
/(e*x+d)-n*(1/e^2*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))-1/e^2*ln(e*x+d)+1/e
^2*ln(e*x)))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(
I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^
n)^3+2*b*ln(c)+2*a)^2*(1/e^2*ln(e*x+d)+1/e^2*d/(e*x+d))
```

3.102.5 Fricas [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{(ex+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*x*log(c*x^n)^2 + 2*a*b*x*log(c*x^n) + a^2*x)/(e^2*x^2 + 2*d*
e*x + d^2), x)
```

3.102.6 Sympy [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))**2/(e*x+d)**2,x)
```

output
```
Integral(x*(a + b*log(c*x**n))**2/(d + e*x)**2, x)
```

3.102.7 Maxima [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{(ex+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="maxima")
```

output
```
a^2*(d/(e^3*x + d*e^2) + log(e*x + d)/e^2) + integrate((b^2*x*log(x^n)^2 +
 2*(b^2*log(c) + a*b)*x*log(x^n) + (b^2*log(c)^2 + 2*a*b*log(c))*x)/(e^2*x
^2 + 2*d*e*x + d^2), x)
```

3.102.8 Giac [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{(ex+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x/(e*x + d)^2, x)
```

3.102.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^2}\,dx$$

input
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x)^2,x)
```

output
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x)^2, x)
```

3.103 $\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$

3.103.1 Optimal result

Integrand size = 20, antiderivative size = 77

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx=\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{de}-\frac{2b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{de}$$

output
```
x*(a+b*ln(c*x^n))^2/d/(e*x+d)-2*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d/e-2*b^2*
n^2*polylog(2,-e*x/d)/d/e
```

3.103.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 81, normalized size of antiderivative = 1.05

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx=\frac{(a+b\log(cx^n))\left(aex+bex\log(cx^n)-2bn(d+ex)\log\left(1+\frac{ex}{d}\right)\right)-2b^2n^2(d+ex)\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{de(d+ex)}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(d + e*x)^2,x]
```

output
```
((a + b*Log[c*x^n])*(a*e*x + b*e*x*Log[c*x^n] - 2*b*n*(d + e*x)*Log[1 + (e
*x)/d]) - 2*b^2*n^2*(d + e*x)*PolyLog[2, -((e*x)/d)])/(d*e*(d + e*x))
```

3.103.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 71, normalized size of antiderivative = 0.92, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.150, Rules used = {2755, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx$$

$$\Big\downarrow \text{ 2755}$$

$$\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\int \frac{a+b\log(cx^n)}{d+ex}dx}{d}$$

$$\Big\downarrow \text{ 2754}$$

$$\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}$$

$$\Big\downarrow \text{ 2838}$$

$$\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(d + e*x)^2,x]
```

output
```
(x*(a + b*Log[c*x^n])^2)/(d*(d + e*x)) - (2*b*n*(((a + b*Log[c*x^n])*Log[1
 + (e*x)/d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e))/d
```

3.103.3.1 Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.103.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.40 (sec) , antiderivative size = 369, normalized size of antiderivative = 4.79

method	result
risch	$-\frac{b^2\ln(x^n)^2}{e(ex+d)}-\frac{2b^2n\ln(x^n)\ln(ex+d)}{ed}+\frac{2b^2n\ln(x^n)\ln(x)}{ed}-\frac{b^2n^2\ln(x)^2}{ed}+\frac{2b^2n^2\ln(ex+d)\ln\left(-\frac{ex}{d}\right)}{ed}+\frac{2b^2n^2\,\mathrm{dilog}\left(-\frac{ex}{d}\right)}{ed}+$

input
```
int((a+b*ln(c*x^n))^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2/e/(e*x+d)-2*b^2/e*n*ln(x^n)/d*ln(e*x+d)+2*b^2/e*n*ln(x^n)/d
*ln(x)-b^2/e*n^2/d*ln(x)^2+2*b^2/e*n^2/d*ln(e*x+d)*ln(-e*x/d)+2*b^2/e*n^2/
d*dilog(-e*x/d)+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I
*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n
)^3+2*b*ln(c)+2*a)*b*(-ln(x^n)/e/(e*x+d)+1/e*n*(-1/d*ln(e*x+d)+1/d*ln(x)))
-1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*
c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(
c)+2*a)^2/(e*x+d)/e
```

3.103.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx=\int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^2*x^2 + 2*d*e*x +
d^2), x)
```

3.103.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/(e*x+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(d + e*x)**2, x)
```

3.103.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="maxima")
```

output
```
-2*a*b*n*(log(e*x + d)/(d*e) - log(x)/(d*e)) - b^2*(log(x^n)^2/(e^2*x + d*
e) - integrate((e*x*log(c)^2 + 2*(d*n + (e*n + e*log(c))*x)*log(x^n))/(e^3
*x^3 + 2*d*e^2*x^2 + d^2*e*x), x)) - 2*a*b*log(c*x^n)/(e^2*x + d*e) - a^2/
(e^2*x + d*e)
```

3.103.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/(e*x + d)^2, x)
```

3.103.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(d + e*x)^2,x)
```

output
```
int((a + b*log(c*x^n))^2/(d + e*x)^2, x)
```

3.104 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx$

3.104.1 Optimal result

Integrand size = 23, antiderivative size = 151

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx = -\frac{ex(a+b\log(cx^n))^2}{d^2(d+ex)} - \frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^2} + \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^2} + \frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2} + \frac{2b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2} + \frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^2}$$

output
```
-e*x*(a+b*ln(c*x^n))^2/d^2/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d^2+2*b*n
*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^2+2*b*n*(a+b*ln(c*x^n))*polylog(2,-d/e/x)/d
^2+2*b^2*n^2*polylog(2,-e*x/d)/d^2+2*b^2*n^2*polylog(3,-d/e/x)/d^2
```

3.104.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 166, normalized size of antiderivative = 1.10

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx = \frac{-3(a+b\log(cx^n))^2 + \frac{3d(a+b\log(cx^n))^2}{d+ex} + \frac{(a+b\log(cx^n))^3}{bn} + 6bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right) - 3(a+b\log(cx^n)$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x)^2),x]
```

output
```
(-3*(a + b*Log[c*x^n])^2 + (3*d*(a + b*Log[c*x^n])^2)/(d + e*x) + (a + b*L
og[c*x^n])^3/(b*n) + 6*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 3*(a + b*
Log[c*x^n])^2*Log[1 + (e*x)/d] + 6*b^2*n^2*PolyLog[2, -((e*x)/d)] - 6*b*n*
(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 6*b^2*n^2*PolyLog[3, -((e*x)/d
)])/(3*d^2)
```

3.104.3 Rubi [A] (verified)

Time = 0.85 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.03, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {2789, 2755, 2754, 2779, 2821, 2838, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx$$

$$\Big\downarrow \text{2789}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}$$

$$\Big\downarrow \text{2755}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\int \frac{a+b\log(cx^n)}{d+ex}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2754}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{\frac{2bn\int \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2821}$$

$$\frac{\frac{2bn\left(\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{2bn\left(\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\frac{bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{7143}$$

$$\frac{\frac{2bn\left(\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\frac{bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}\right)}{d}\right)}{d}$$

input

```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x)^2),x]
```

3.104. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx$

output
```
-((e*((x*(a + b*Log[c*x^n])^2)/(d*(d + e*x)) - (2*b*n*(((a + b*Log[c*x^n])
*Log[1 + (e*x)/d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e))/d))/d) + (-((Log[1
 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*x^n])*PolyLog[
2, -(d/(e*x))] + b*n*PolyLog[3, -(d/(e*x))]))/d)/d
```

3.104.3.1 Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.104.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.43 (sec) , antiderivative size = 683, normalized size of antiderivative = 4.52

method	result
risch	$-\frac{b^2\ln(x^n)^2\ln(ex+d)}{d^2}+\frac{b^2\ln(x^n)^2}{d(ex+d)}+\frac{b^2\ln(x^n)^2\ln(x)}{d^2}+\frac{2b^2n\ln(x^n)\ln(ex+d)}{d^2}-\frac{2b^2n\ln(x^n)\ln(x)}{d^2}+\frac{b^2n^2\ln(x)^2}{d^2}-\frac{2b^2n^2}{}$

input
```
int((a+b*ln(c*x^n))^2/x/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2/d^2*ln(e*x+d)+b^2*ln(x^n)^2/d/(e*x+d)+b^2*ln(x^n)^2/d^2*ln(
x)+2*b^2*n*ln(x^n)/d^2*ln(e*x+d)-2*b^2*n*ln(x^n)/d^2*ln(x)+b^2/d^2*n^2*ln(
x)^2-2*b^2/d^2*n^2*ln(e*x+d)*ln(-e*x/d)-2*b^2/d^2*n^2*dilog(-e*x/d)-b^2*n/
d^2*ln(x^n)*ln(x)^2+1/3*b^2/d^2*ln(x)^3*n^2-2*b^2/d^2*ln(x)*ln(e*x+d)*ln(-
e*x/d)*n^2-2*b^2/d^2*ln(x)*dilog(-e*x/d)*n^2+2*b^2*n/d^2*ln(x^n)*ln(e*x+d)
*ln(-e*x/d)+2*b^2*n/d^2*ln(x^n)*dilog(-e*x/d)+b^2/d^2*n^2*ln(e*x+d)*ln(x)^
2-b^2/d^2*n^2*ln(x)^2*ln(1+e*x/d)-2*b^2/d^2*n^2*ln(x)*polylog(2,-e*x/d)+2*
b^2/d^2*n^2*polylog(3,-e*x/d)+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*P
i*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(-ln(x^n)/d^2*ln(e*x+d)+ln(x^n)/d/(e*x+
d)+ln(x^n)/d^2*ln(x)-n*(1/2/d^2*ln(x)^2-1/d^2*ln(e*x+d)+1/d^2*ln(x)-1/d^2*
ln(e*x+d)*ln(-e*x/d)-1/d^2*dilog(-e*x/d)))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn
(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(-1/d^2*ln(e*x+d)+1/d/
(e*x+d)+1/d^2*ln(x))
```

3.104.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^2*x^3 + 2*d*e*x^2
+ d^2*x), x)
```

3.104.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx = \int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(e*x+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x*(d + e*x)**2), x)
```

3.104.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^2,x, algorithm="maxima")
```

output
```
a^2*(1/(d*e*x + d^2) - log(e*x + d)/d^2 + log(x)/d^2) + integrate((b^2*log
(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e^
2*x^3 + 2*d*e*x^2 + d^2*x), x)
```

3.104.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^2*x), x)
```

3.104.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x\,(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)^2), x)
```

3.105 $\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx$

3.105.1 Optimal result

Integrand size = 23, antiderivative size = 211

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx = &-\frac{2b^2n^2}{d^2x}-\frac{2bn(a+b\log(cx^n))}{d^2x}-\frac{(a+b\log(cx^n))^2}{d^2x}\\ &+\frac{e^2x(a+b\log(cx^n))^2}{d^3(d+ex)}+\frac{2e\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^3}\\ &-\frac{2ben(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^3}\\ &-\frac{4ben(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^3}\\ &-\frac{2b^2en^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3}-\frac{4b^2en^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^3}\end{aligned}$$

output
```
-2*b^2*n^2/d^2/x-2*b*n*(a+b*ln(c*x^n))/d^2/x-(a+b*ln(c*x^n))^2/d^2/x+e^2*x
*(a+b*ln(c*x^n))^2/d^3/(e*x+d)+2*e*ln(1+d/e/x)*(a+b*ln(c*x^n))^2/d^3-2*b*e
*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^3-4*b*e*n*(a+b*ln(c*x^n))*polylog(2,-d/e/
x)/d^3-2*b^2*e*n^2*polylog(2,-e*x/d)/d^3-4*b^2*e*n^2*polylog(3,-d/e/x)/d^3
```

3.105.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 223, normalized size of antiderivative = 1.06

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx = -\frac{\frac{6b^2dn^2}{x}+\frac{6bdn(a+b\log(cx^n))}{x}-3e(a+b\log(cx^n))^2+\frac{3d(a+b\log(cx^n))^2}{x}+\frac{3de(a+b\log(cx^n))^2}{d+ex}+\frac{2e(a+b\log(cx^n))^3}{bn}+6be}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^2),x]
```

output
```
-1/3*((6*b^2*d*n^2)/x + (6*b*d*n*(a + b*Log[c*x^n]))/x - 3*e*(a + b*Log[c*
x^n])^2 + (3*d*(a + b*Log[c*x^n])^2)/x + (3*d*e*(a + b*Log[c*x^n])^2)/(d +
 e*x) + (2*e*(a + b*Log[c*x^n])^3)/(b*n) + 6*b*e*n*(a + b*Log[c*x^n])*Log[
1 + (e*x)/d] - 6*e*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 6*b^2*e*n^2*Pol
yLog[2, -((e*x)/d)] - 12*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] +
 12*b^2*e*n^2*PolyLog[3, -((e*x)/d)])/d^3
```

3.105.3 Rubi [A] (verified)

Time = 0.54 (sec) , antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{e^2(a+b\log(cx^n))^2}{d^2(d+ex)^2}-\frac{2e(a+b\log(cx^n))^2}{d^2x(d+ex)}+\frac{(a+b\log(cx^n))^2}{d^2x^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^2x(a+b\log(cx^n))^2}{d^3(d+ex)}-\frac{4ben\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^3}-\frac{2ben\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^3}+\frac{2e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^3}-\frac{2bn(a+b\log(cx^n))}{d^2x}-\frac{(a+b\log(cx^n))^2}{d^2x}-\frac{2b^2en^2\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3}-\frac{4b^2en^2\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^3}-\frac{2b^2n^2}{d^2x}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^2),x]
```

output
```
(-2*b^2*n^2)/(d^2*x) - (2*b*n*(a + b*Log[c*x^n]))/(d^2*x) - (a + b*Log[c*x
^n])^2/(d^2*x) + (e^2*x*(a + b*Log[c*x^n])^2)/(d^3*(d + e*x)) + (2*e*Log[1
 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d^3 - (2*b*e*n*(a + b*Log[c*x^n])*Log[1
+ (e*x)/d])/d^3 - (4*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))])/d^3
- (2*b^2*e*n^2*PolyLog[2, -((e*x)/d)])/d^3 - (4*b^2*e*n^2*PolyLog[3, -(d/(
e*x))])/d^3
```

3.105.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.105.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.44 (sec) , antiderivative size = 790, normalized size of antiderivative = 3.74

method	result	size
risch	Expression too large to display	790

input
```
int((a+b*ln(c*x^n))^2/x^2/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2/d^2*e/(e*x+d)+2*b^2*ln(x^n)^2/d^3*e*ln(e*x+d)-b^2*ln(x^n)^2
/d^2/x-2*b^2*ln(x^n)^2/d^3*e*ln(x)-2*b^2*n*ln(x^n)/d^3*e*ln(e*x+d)-2*b^2*n
*ln(x^n)/d^2/x+2*b^2*n*ln(x^n)/d^3*e*ln(x)-b^2/d^3*n^2*e*ln(x)^2-2*b^2*n^2
/d^2/x+2*b^2/d^3*n^2*e*ln(e*x+d)*ln(-e*x/d)+2*b^2/d^3*n^2*e*dilog(-e*x/d)+
2*b^2*n/d^3*e*ln(x^n)*ln(x)^2-2/3*b^2/d^3*e*ln(x)^3*n^2+4*b^2/d^3*e*ln(x)*
ln(e*x+d)*ln(-e*x/d)*n^2+4*b^2/d^3*e*ln(x)*dilog(-e*x/d)*n^2-4*b^2*n/d^3*e
*ln(x^n)*ln(e*x+d)*ln(-e*x/d)-4*b^2*n/d^3*e*ln(x^n)*dilog(-e*x/d)-2*b^2/d^
3*e*n^2*ln(e*x+d)*ln(x)^2+2*b^2/d^3*e*n^2*ln(x)^2*ln(1+e*x/d)+4*b^2/d^3*e*
n^2*ln(x)*polylog(2,-e*x/d)-4*b^2/d^3*e*n^2*polylog(3,-e*x/d)+(-I*b*Pi*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(-ln(x^
n)/d^2*e/(e*x+d)+2*ln(x^n)/d^3*e*ln(e*x+d)-ln(x^n)/d^2/x-2*ln(x^n)/d^3*e*l
n(x)-n*(-1/d^3*e*ln(x)^2+2/d^3*e*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))+1/d^
3*e*ln(e*x+d)+1/d^2/x-1/d^3*e*ln(x)))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*c
sgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*
x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(-1/d^2*e/(e*x+d)+2/d^3*e*l
n(e*x+d)-1/d^2/x-2/d^3*e*ln(x))
```

3.105.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^2*x^4 + 2*d*e*x^3
+ d^2*x^2), x)
```

3.105.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx = \int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**2/(e*x+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**2*(d + e*x)**2), x)
```

3.105.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx=\int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^2,x, algorithm="maxima")
```

output
```
-a^2*((2*e*x + d)/(d^2*e*x^2 + d^3*x) - 2*e*log(e*x + d)/d^3 + 2*e*log(x)/
d^3) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*lo
g(c) + a*b)*log(x^n))/(e^2*x^4 + 2*d*e*x^3 + d^2*x^2), x)
```

3.105.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx=\int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^2*x^2), x)
```

3.105.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^2}\,dx=\int \frac{(a+b\,\ln(c\,x^n))^2}{x^2\,(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^2), x)
```

3.106 $\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx$

3.106.1 Optimal result

Integrand size = 23, antiderivative size = 285

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx =& -\frac{b^2n^2}{4d^2x^2}+\frac{4b^2en^2}{d^3x}-\frac{bn(a+b\log(cx^n))}{2d^2x^2}+\frac{4ben(a+b\log(cx^n))}{d^3x}\\ &-\frac{(a+b\log(cx^n))^2}{2d^2x^2}+\frac{2e(a+b\log(cx^n))^2}{d^3x}\\ &-\frac{e^3x(a+b\log(cx^n))^2}{d^4(d+ex)}-\frac{3e^2\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^2}{d^4}\\ &+\frac{2be^2n(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^4}\\ &+\frac{6be^2n(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4}\\ &+\frac{2b^2e^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4}+\frac{6b^2e^2n^2\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^4}\end{aligned}$$

output
```
-1/4*b^2*n^2/d^2/x^2+4*b^2*e*n^2/d^3/x-1/2*b*n*(a+b*ln(c*x^n))/d^2/x^2+4*b
*e*n*(a+b*ln(c*x^n))/d^3/x-1/2*(a+b*ln(c*x^n))^2/d^2/x^2+2*e*(a+b*ln(c*x^n
))^2/d^3/x-e^3*x*(a+b*ln(c*x^n))^2/d^4/(e*x+d)-3*e^2*ln(1+d/e/x)*(a+b*ln(c
*x^n))^2/d^4+2*b*e^2*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^4+6*b*e^2*n*(a+b*ln(c
*x^n))*polylog(2,-d/e/x)/d^4+2*b^2*e^2*n^2*polylog(2,-e*x/d)/d^4+6*b^2*e^2
*n^2*polylog(3,-d/e/x)/d^4
```

3.106.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 268, normalized size of antiderivative = 0.94

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx$$
$$= \frac{-\frac{2d^2(a+b\log(cx^n))^2}{x^2}+\frac{8de(a+b\log(cx^n))^2}{x}+\frac{4de^2(a+b\log(cx^n))^2}{d+ex}+\frac{4e^2(a+b\log(cx^n))^3}{bn}+\frac{16bden(a+bn+b\log(cx^n))}{x}-\frac{bd^2n(2a+bn}{x}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^3*(d + e*x)^2),x]
```

output
```
((-2*d^2*(a + b*Log[c*x^n])^2)/x^2 + (8*d*e*(a + b*Log[c*x^n])^2)/x + (4*d
*e^2*(a + b*Log[c*x^n])^2)/(d + e*x) + (4*e^2*(a + b*Log[c*x^n])^3)/(b*n)
+ (16*b*d*e*n*(a + b*n + b*Log[c*x^n]))/x - (b*d^2*n*(2*a + b*n + 2*b*Log[
c*x^n]))/x^2 - 12*e^2*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 4*e^2*(-((a
+ b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1 + (e*x)/d])) + 2*b^2*n^2*P
olyLog[2, -((e*x)/d)]) - 24*b*e^2*n*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)
/d)] - b*n*PolyLog[3, -((e*x)/d)]))/(4*d^4)
```

3.106.3 Rubi [A] (verified)

Time = 0.63 (sec) , antiderivative size = 285, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx$$

$$\Big\downarrow \; 2795$$

$$\int \left(-\frac{e^3(a+b\log(cx^n))^2}{d^3(d+ex)^2}+\frac{3e^2(a+b\log(cx^n))^2}{d^3x(d+ex)}-\frac{2e(a+b\log(cx^n))^2}{d^3x^2}+\frac{(a+b\log(cx^n))^2}{d^2x^3}\right)dx$$

$$\Big\downarrow \; 2009$$

$$-\frac{e^3x(a+b\log(cx^n))^2}{d^4(d+ex)}+\frac{6be^2n\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4}-\frac{3e^2\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^4}+\frac{2be^2n\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^4}+\frac{2e(a+b\log(cx^n))^2}{d^3x}+\frac{4ben(a+b\log(cx^n))}{d^3x}-\frac{(a+b\log(cx^n))^2}{2d^2x^2}-\frac{bn(a+b\log(cx^n))}{2d^2x^2}+\frac{2b^2e^2n^2\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4}+\frac{6b^2e^2n^2\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^4}+\frac{4b^2en^2}{d^3x}-\frac{b^2n^2}{4d^2x^2}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^3*(d + e*x)^2),x]
```

output
```
-1/4*(b^2*n^2)/(d^2*x^2) + (4*b^2*e*n^2)/(d^3*x) - (b*n*(a + b*Log[c*x^n])
)/(2*d^2*x^2) + (4*b*e*n*(a + b*Log[c*x^n]))/(d^3*x) - (a + b*Log[c*x^n])^
2/(2*d^2*x^2) + (2*e*(a + b*Log[c*x^n])^2)/(d^3*x) - (e^3*x*(a + b*Log[c*x
^n])^2)/(d^4*(d + e*x)) - (3*e^2*Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d^
4 + (2*b*e^2*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/d^4 + (6*b*e^2*n*(a +
b*Log[c*x^n])*PolyLog[2, -(d/(e*x))])/d^4 + (2*b^2*e^2*n^2*PolyLog[2, -((e
*x)/d)])/d^4 + (6*b^2*e^2*n^2*PolyLog[3, -(d/(e*x))])/d^4
```

3.106.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.106.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.48 (sec) , antiderivative size = 924, normalized size of antiderivative = 3.24

method	result	size
risch	Expression too large to display	924

input
```
int((a+b*ln(c*x^n))^2/x^3/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b^2*ln(x^n)^2/d^2/x^2+2*b^2*ln(x^n)^2/d^3*e/x-6*b^2/d^4*e^2*ln(x)*ln(
e*x+d)*ln(-e*x/d)*n^2+6*b^2*n/d^4*e^2*ln(x^n)*ln(e*x+d)*ln(-e*x/d)+b^2*ln(
x^n)^2/d^3*e^2/(e*x+d)+4*b^2*n*ln(x^n)/d^3*e/x+4*b^2*e*n^2/d^3/x+(-I*b*Pi*
csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*P
i*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(-3*
ln(x^n)/d^4*e^2*ln(e*x+d)+ln(x^n)/d^3*e^2/(e*x+d)-1/2*ln(x^n)/d^2/x^2+3*ln
(x^n)/d^4*e^2*ln(x)+2*ln(x^n)/d^3*e/x-1/2*n*(-2/d^4*e^2*ln(e*x+d)+1/2/d^2/
x^2-4/d^3*e/x+2/d^4*e^2*ln(x)+3/d^4*e^2*ln(x)^2-6/d^4*e^2*(dilog(-e*x/d)+l
n(e*x+d)*ln(-e*x/d))))+2*b^2*n*ln(x^n)/d^4*e^2*ln(e*x+d)-2*b^2*n*ln(x^n)/d
^4*e^2*ln(x)-2*b^2/d^4*n^2*e^2*ln(e*x+d)*ln(-e*x/d)-3*b^2*n/d^4*e^2*ln(x^n
)*ln(x)^2-6*b^2/d^4*e^2*ln(x)*dilog(-e*x/d)*n^2+6*b^2*n/d^4*e^2*ln(x^n)*di
log(-e*x/d)+3*b^2/d^4*e^2*n^2*ln(e*x+d)*ln(x)^2-3*b^2/d^4*e^2*n^2*ln(x)^2*
ln(1+e*x/d)-6*b^2/d^4*e^2*n^2*ln(x)*polylog(2,-e*x/d)+1/4*(-I*b*Pi*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(
I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(-3/d^4*e^2
*ln(e*x+d)+1/d^3*e^2/(e*x+d)-1/2/d^2/x^2+3/d^4*e^2*ln(x)+2/d^3*e/x)-3*b^2*
ln(x^n)^2/d^4*e^2*ln(e*x+d)+3*b^2*ln(x^n)^2/d^4*e^2*ln(x)-1/2*b^2*n*ln(x^n
)/d^2/x^2+b^2/d^4*n^2*e^2*ln(x)^2-2*b^2/d^4*n^2*e^2*dilog(-e*x/d)+b^2/d^4*
e^2*ln(x)^3*n^2+6*b^2/d^4*e^2*n^2*polylog(3,-e*x/d)-1/4*b^2*n^2/d^2/x^2
```

3.106.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^3/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^2*x^5 + 2*d*e*x^4
+ d^2*x^3), x)
```

3.106.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx = \int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**3/(e*x+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**3*(d + e*x)**2), x)
```

3.106.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^3/(e*x+d)^2,x, algorithm="maxima")
```

output
```
1/2*a^2*((6*e^2*x^2 + 3*d*e*x - d^2)/(d^3*e*x^3 + d^4*x^2) - 6*e^2*log(e*x
 + d)/d^4 + 6*e^2*log(x)/d^4) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 +
 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e^2*x^5 + 2*d*e*x^4 + d^2*
x^3), x)
```

3.106.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^3/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^2*x^3), x)
```

3.106.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^3(d+ex)^2}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x^3\,(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^3*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^3*(d + e*x)^2), x)
```

3.107 $\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

3.107.1 Optimal result

Integrand size = 23, antiderivative size = 296

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = -\frac{2abnx}{e^3}+\frac{2b^2n^2x}{e^3}-\frac{2b^2nx\log(cx^n)}{e^3}+\frac{bdnx(a+b\log(cx^n))}{e^3(d+ex)} -\frac{d(a+b\log(cx^n))^2}{2e^4}+\frac{x(a+b\log(cx^n))^2}{e^3} +\frac{d^3(a+b\log(cx^n))^2}{2e^4(d+ex)^2}+\frac{3dx(a+b\log(cx^n))^2}{e^3(d+ex)} -\frac{b^2dn^2\log(d+ex)}{e^4}-\frac{5bdn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^4} -\frac{3d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^4}-\frac{5b^2dn^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4} -\frac{6bdn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4} +\frac{6b^2dn^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}$$

output
```
-2*a*b*n*x/e^3+2*b^2*n^2*x/e^3-2*b^2*n*x*ln(c*x^n)/e^3+b*d*n*x*(a+b*ln(c*x
^n))/e^3/(e*x+d)-1/2*d*(a+b*ln(c*x^n))^2/e^4+x*(a+b*ln(c*x^n))^2/e^3+1/2*d
^3*(a+b*ln(c*x^n))^2/e^4/(e*x+d)^2+3*d*x*(a+b*ln(c*x^n))^2/e^3/(e*x+d)-b^2
*d*n^2*ln(e*x+d)/e^4-5*b*d*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^4-3*d*(a+b*ln(c
*x^n))^2*ln(1+e*x/d)/e^4-5*b^2*d*n^2*polylog(2,-e*x/d)/e^4-6*b*d*n*(a+b*ln
(c*x^n))*polylog(2,-e*x/d)/e^4+6*b^2*d*n^2*polylog(3,-e*x/d)/e^4
```

3.107.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 258, normalized size of antiderivative = 0.87

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$
$$= \frac{-\frac{2bd^2n(a+b\log(cx^n))}{d+ex} + 5d(a+b\log(cx^n))^2 + 2ex(a+b\log(cx^n))^2 + \frac{d^3(a+b\log(cx^n))^2}{(d+ex)^2} - \frac{6d^2(a+b\log(cx^n))^2}{d+ex} - 4ben}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
((-2*b*d^2*n*(a + b*Log[c*x^n]))/(d + e*x) + 5*d*(a + b*Log[c*x^n])^2 + 2*
e*x*(a + b*Log[c*x^n])^2 + (d^3*(a + b*Log[c*x^n])^2)/(d + e*x)^2 - (6*d^2
*(a + b*Log[c*x^n])^2)/(d + e*x) - 4*b*e*n*x*(a - b*n + b*Log[c*x^n]) + 2*
b^2*d*n^2*(Log[x] - Log[d + e*x]) - 10*b*d*n*(a + b*Log[c*x^n])*Log[1 + (e
*x)/d] - 6*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] - 10*b^2*d*n^2*PolyLog[
2, -((e*x)/d)] - 12*b*d*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 12*b
^2*d*n^2*PolyLog[3, -((e*x)/d)])/(2*e^4)
```

3.107.3 Rubi [A] (verified)

Time = 0.71 (sec) , antiderivative size = 327, normalized size of antiderivative = 1.10, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$
$$\Big\downarrow \text{2795}$$
$$\int \left(-\frac{d^3(a+b\log(cx^n))^2}{e^3(d+ex)^3} + \frac{3d^2(a+b\log(cx^n))^2}{e^3(d+ex)^2} - \frac{3d(a+b\log(cx^n))^2}{e^3(d+ex)} + \frac{(a+b\log(cx^n))^2}{e^3}\right)dx$$
$$\Big\downarrow \text{2009}$$

$$\frac{d^3(a+b\log(cx^n))^2}{2e^4(d+ex)^2}-\frac{6bdn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^4}+\frac{bdn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{e^4}-\frac{3d\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^4}-\frac{6bdn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^4}+\frac{3dx(a+b\log(cx^n))^2}{e^3(d+ex)}+\frac{bdnx(a+b\log(cx^n))}{e^3(d+ex)}+\frac{x(a+b\log(cx^n))^2}{e^3}-\frac{2abnx}{e^3}-\frac{2b^2nx\log(cx^n)}{e^3}-\frac{b^2dn^2\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{e^4}-\frac{6b^2dn^2\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}+\frac{6b^2dn^2\,\mathrm{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}-\frac{b^2dn^2\log(d+ex)}{e^4}+\frac{2b^2n^2x}{e^3}$$

input
```
Int[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
(-2*a*b*n*x)/e^3 + (2*b^2*n^2*x)/e^3 - (2*b^2*n*x*Log[c*x^n])/e^3 + (b*d*n
*x*(a + b*Log[c*x^n]))/(e^3*(d + e*x)) + (b*d*n*Log[1 + d/(e*x)]*(a + b*Lo
g[c*x^n]))/e^4 + (x*(a + b*Log[c*x^n])^2)/e^3 + (d^3*(a + b*Log[c*x^n])^2)
/(2*e^4*(d + e*x)^2) + (3*d*x*(a + b*Log[c*x^n])^2)/(e^3*(d + e*x)) - (b^2
*d*n^2*Log[d + e*x])/e^4 - (6*b*d*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e
^4 - (3*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^4 - (b^2*d*n^2*PolyLog[
2, -(d/(e*x))])/e^4 - (6*b^2*d*n^2*PolyLog[2, -((e*x)/d)])/e^4 - (6*b*d*n*
(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])/e^4 + (6*b^2*d*n^2*PolyLog[3, -
((e*x)/d)])/e^4
```

3.107.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.107.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.52 (sec) , antiderivative size = 827, normalized size of antiderivative = 2.79

method	result	size
risch	Expression too large to display	827

input
```
int(x^3*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2*x/e^3-3*b^2*ln(x^n)^2/e^4*d*ln(e*x+d)-3*b^2*ln(x^n)^2/e^4*d^
2/(e*x+d)+1/2*b^2*ln(x^n)^2*d^3/e^4/(e*x+d)^2-2*b^2*n*ln(x^n)*x/e^3-5*b^2*
n*ln(x^n)/e^4*d*ln(e*x+d)-b^2*n*ln(x^n)/e^4*d^2/(e*x+d)+5*b^2*n/e^4*ln(x)*
ln(x^n)*d+2*b^2*n^2*x/e^3-b^2*d*n^2*ln(e*x+d)/e^4+b^2/e^4*n^2*d*ln(x)-5/2*
b^2/e^4*n^2*d*ln(x)^2+5*b^2/e^4*n^2*ln(e*x+d)*ln(-e*x/d)*d+5*b^2/e^4*n^2*d
ilog(-e*x/d)*d-6*b^2/e^4*d*ln(e*x+d)*ln(-e*x/d)*ln(x)*n^2+6*b^2*n/e^4*d*ln
(x^n)*ln(e*x+d)*ln(-e*x/d)-6*b^2/e^4*d*dilog(-e*x/d)*ln(x)*n^2+6*b^2*n/e^4
*d*ln(x^n)*dilog(-e*x/d)+3*b^2/e^4*d*n^2*ln(e*x+d)*ln(x)^2-3*b^2/e^4*d*n^2
*ln(x)^2*ln(1+e*x/d)-6*b^2/e^4*d*n^2*ln(x)*polylog(2,-e*x/d)+6*b^2*d*n^2*p
olylog(3,-e*x/d)/e^4+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*c
sgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*
c*x^n)^3+2*b*ln(c)+2*a)*b*(ln(x^n)*x/e^3-3*ln(x^n)/e^4*d*ln(e*x+d)-3*ln(x^
n)/e^4*d^2/(e*x+d)+1/2*ln(x^n)*d^3/e^4/(e*x+d)^2-1/2*n*(1/e^4*(2*e*x+2*d+5
*d*ln(e*x+d)+d^2/(e*x+d)-5*d*ln(e*x))-6/e^4*d*(dilog(-e*x/d)+ln(e*x+d)*ln(
-e*x/d))))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*
c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)
^3+2*b*ln(c)+2*a)^2*(x/e^3-3/e^4*d*ln(e*x+d)-3/e^4*d^2/(e*x+d)+1/2*d^3/e^4
/(e*x+d)^2)
```

3.107.5 Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^3}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^2*x^3*log(c*x^n)^2 + 2*a*b*x^3*log(c*x^n) + a^2*x^3)/(e^3*x^3
+ 3*d*e^2*x^2 + 3*d^2*e*x + d^3), x)
```

3.107.6 Sympy [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))**2/(d + e*x)**3, x)
```

3.107.7 Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^3}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
-1/2*a^2*((6*d^2*e*x + 5*d^3)/(e^6*x^2 + 2*d*e^5*x + d^2*e^4) - 2*x/e^3 +
6*d*log(e*x + d)/e^4) + integrate((b^2*x^3*log(x^n)^2 + 2*(b^2*log(c) + a*
b)*x^3*log(x^n) + (b^2*log(c)^2 + 2*a*b*log(c))*x^3)/(e^3*x^3 + 3*d*e^2*x^
2 + 3*d^2*e*x + d^3), x)
```

3.107.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^3}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^3/(e*x + d)^3, x)
```

3.107.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^3}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^3,x)
```

output
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^3, x)
```

3.108 $\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

3.108.1 Optimal result

Integrand size = 23, antiderivative size = 232

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = &-\frac{bnx(a+b\log(cx^n))}{e^2(d+ex)}+\frac{(a+b\log(cx^n))^2}{2e^3}\\&-\frac{d^2(a+b\log(cx^n))^2}{2e^3(d+ex)^2}-\frac{2x(a+b\log(cx^n))^2}{e^2(d+ex)}\\&+\frac{b^2n^2\log(d+ex)}{e^3}+\frac{3bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{e^3}\\&+\frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^3}+\frac{3b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}\\&+\frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}\\&-\frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}\end{aligned}$$

output
```
-b*n*x*(a+b*ln(c*x^n))/e^2/(e*x+d)+1/2*(a+b*ln(c*x^n))^2/e^3-1/2*d^2*(a+b*
ln(c*x^n))^2/e^3/(e*x+d)^2-2*x*(a+b*ln(c*x^n))^2/e^2/(e*x+d)+b^2*n^2*ln(e*
x+d)/e^3+3*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^3+(a+b*ln(c*x^n))^2*ln(1+e*x/
d)/e^3+3*b^2*n^2*polylog(2,-e*x/d)/e^3+2*b*n*(a+b*ln(c*x^n))*polylog(2,-e*
x/d)/e^3-2*b^2*n^2*polylog(3,-e*x/d)/e^3
```

3.108.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 212, normalized size of antiderivative = 0.91

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$
$$= \frac{\frac{2bdn(a+b\log(cx^n))}{d+ex} - 3(a+b\log(cx^n))^2 - \frac{d^2(a+b\log(cx^n))^2}{(d+ex)^2} + \frac{4d(a+b\log(cx^n))^2}{d+ex} - 2b^2n^2(\log(x)-\log(d+ex)) + 6}{}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
((2*b*d*n*(a + b*Log[c*x^n]))/(d + e*x) - 3*(a + b*Log[c*x^n])^2 - (d^2*(a
 + b*Log[c*x^n])^2)/(d + e*x)^2 + (4*d*(a + b*Log[c*x^n])^2)/(d + e*x) - 2
*b^2*n^2*(Log[x] - Log[d + e*x]) + 6*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/
d] + 2*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 6*b^2*n^2*PolyLog[2, -((e*x
)/d)] + 4*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - 4*b^2*n^2*PolyLo
g[3, -((e*x)/d)])/(2*e^3)
```

3.108.3 Rubi [A] (verified)

Time = 0.63 (sec) , antiderivative size = 262, normalized size of antiderivative = 1.13, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$
$$\Big\downarrow \ 2795$$
$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{e^2(d+ex)^3} + \frac{(a+b\log(cx^n))^2}{e^2(d+ex)} - \frac{2d(a+b\log(cx^n))^2}{e^2(d+ex)^2}\right)dx$$
$$\Big\downarrow \ 2009$$

$$-\frac{d^2(a+b\log(cx^n))^2}{2e^3(d+ex)^2}+\frac{2bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^3}-\frac{bn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{e^3}+\frac{4bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^3}+\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^3}-\frac{bnx(a+b\log(cx^n))}{e^2(d+ex)}-\frac{2x(a+b\log(cx^n))^2}{e^2(d+ex)}+\frac{b^2n^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{e^3}+\frac{4b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^3}-\frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^3}+\frac{b^2n^2\log(d+ex)}{e^3}$$

input
```
Int[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
-((b*n*x*(a + b*Log[c*x^n]))/(e^2*(d + e*x))) - (b*n*Log[1 + d/(e*x)]*(a +
 b*Log[c*x^n]))/e^3 - (d^2*(a + b*Log[c*x^n])^2)/(2*e^3*(d + e*x)^2) - (2*
x*(a + b*Log[c*x^n])^2)/(e^2*(d + e*x)) + (b^2*n^2*Log[d + e*x])/e^3 + (4*
b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e^3 + ((a + b*Log[c*x^n])^2*Log[1
 + (e*x)/d])/e^3 + (b^2*n^2*PolyLog[2, -(d/(e*x))])/e^3 + (4*b^2*n^2*PolyL
og[2, -((e*x)/d)])/e^3 + (2*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)])
/e^3 - (2*b^2*n^2*PolyLog[3, -((e*x)/d)])/e^3
```

3.108.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.108.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.45 (sec) , antiderivative size = 738, normalized size of antiderivative = 3.18

method	result
risch	$\frac{b^2\ln(x^n)^2\ln(ex+d)}{e^3}+\frac{2b^2\ln(x^n)^2 d}{e^3(ex+d)}-\frac{b^2\ln(x^n)^2 d^2}{2e^3(ex+d)^2}+\frac{b^2 n\ln(x^n)d}{e^3(ex+d)}+\frac{3b^2 n\ln(x^n)\ln(ex+d)}{e^3}-\frac{3b^2 n\ln(x^n)\ln(x)}{e^3}+\frac{b^2 n^2\ln(}{e^3}$

input
```
int(x^2*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
b^2*ln(x^n)^2/e^3*ln(e*x+d)+2*b^2*ln(x^n)^2/e^3*d/(e*x+d)-1/2*b^2*ln(x^n)^
2/e^3*d^2/(e*x+d)^2+b^2*n*ln(x^n)/e^3*d/(e*x+d)+3*b^2*n*ln(x^n)/e^3*ln(e*x
+d)-3*b^2*n/e^3*ln(x^n)*ln(x)+b^2*n^2*ln(e*x+d)/e^3-b^2/e^3*n^2*ln(x)+3/2*
b^2/e^3*n^2*ln(x)^2-3*b^2/e^3*n^2*ln(e*x+d)*ln(-e*x/d)-3*b^2/e^3*n^2*dilog
(-e*x/d)+2*b^2/e^3*ln(e*x+d)*ln(-e*x/d)*ln(x)*n^2-2*b^2*n/e^3*ln(x^n)*ln(e
*x+d)*ln(-e*x/d)+2*b^2/e^3*dilog(-e*x/d)*ln(x)*n^2-2*b^2*n/e^3*ln(x^n)*dil
og(-e*x/d)-b^2/e^3*n^2*ln(e*x+d)*ln(x)^2+b^2/e^3*n^2*ln(x)^2*ln(1+e*x/d)+2
*b^2/e^3*n^2*ln(x)*polylog(2,-e*x/d)-2*b^2*n^2*polylog(3,-e*x/d)/e^3+(-I*b
*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I
*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*
(ln(x^n)/e^3*ln(e*x+d)+2*ln(x^n)/e^3*d/(e*x+d)-1/2*ln(x^n)/e^3*d^2/(e*x+d)
^2-1/2*n*(-1/e^3*d/(e*x+d)-3/e^3*ln(e*x+d)+3/e^3*ln(e*x)+2/e^3*ln(e*x+d)*l
n(-e*x/d)+2/e^3*dilog(-e*x/d)))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2
-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(1/e^3*ln(e*x+d)+2/e^3*d/(e*x+d)-
1/2/e^3*d^2/(e*x+d)^2)
```

3.108.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx=\int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^2*x^2*log(c*x^n)^2 + 2*a*b*x^2*log(c*x^n) + a^2*x^2)/(e^3*x^3
+ 3*d*e^2*x^2 + 3*d^2*e*x + d^3), x)
```

3.108.6 Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))**2/(d + e*x)**3, x)
```

3.108.7 Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*a^2*((4*d*e*x + 3*d^2)/(e^5*x^2 + 2*d*e^4*x + d^2*e^3) + 2*log(e*x + d
)/e^3) + integrate((b^2*x^2*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^2*log(x^n)
 + (b^2*log(c)^2 + 2*a*b*log(c))*x^2)/(e^3*x^3 + 3*d*e^2*x^2 + 3*d^2*e*x +
 d^3), x)
```

3.108.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^2/(e*x + d)^3, x)
```

3.108.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^3}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^3,x)
```

output
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^3, x)
```

3.109 $\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

3.109.1 Optimal result

Integrand size = 21, antiderivative size = 112

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \frac{bnx(a+b\log(cx^n))}{de(d+ex)} + \frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2} - \frac{bn(a+bn+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{de^2} - \frac{b^2n^2\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{de^2}$$

output
```
b*n*x*(a+b*ln(c*x^n))/d/e/(e*x+d)+1/2*x^2*(a+b*ln(c*x^n))^2/d/(e*x+d)^2-b*
n*(a+b*n+b*ln(c*x^n))*ln(1+e*x/d)/d/e^2-b^2*n^2*polylog(2,-e*x/d)/d/e^2
```

3.109.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.38

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \frac{-\frac{2bn(a+b\log(cx^n))}{d+ex} + \frac{(a+b\log(cx^n))^2}{d} + \frac{d(a+b\log(cx^n))^2}{(d+ex)^2} - \frac{2(a+b\log(cx^n))^2}{d+ex} + \frac{2b^2n^2(\log(x)-\log(d+ex))}{d} - \frac{2bn(a+b\log(cx^n))\log(}{d}}{2e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
((-2*b*n*(a + b*Log[c*x^n]))/(d + e*x) + (a + b*Log[c*x^n])^2/d + (d*(a +
b*Log[c*x^n])^2)/(d + e*x)^2 - (2*(a + b*Log[c*x^n])^2)/(d + e*x) + (2*b^2
*n^2*(Log[x] - Log[d + e*x]))/d - (2*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/
d])/d - (2*b^2*n^2*PolyLog[2, -((e*x)/d)])/d)/(2*e^2)
```

3.109.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 107, normalized size of antiderivative = 0.96, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2781, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}dx$$

$$\Big\downarrow \text{2781}$$

$$\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\int \frac{x(a+b\log(cx^n))}{(d+ex)^2}dx}{d}$$

$$\Big\downarrow \text{2784}$$

$$\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\left(\frac{\int \frac{a+bn+b\log(cx^n)}{d+ex}dx}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}\right)}{d}$$

$$\Big\downarrow \text{2754}$$

$$\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\left(\frac{\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{e}-\frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\left(\frac{\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{e}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}\right)}{d}$$

input
```
Int[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
(x^2*(a + b*Log[c*x^n])^2)/(2*d*(d + e*x)^2) - (b*n*(-((x*(a + b*Log[c*x^n
]))/(e*(d + e*x))) + (((a + b*n + b*Log[c*x^n])*Log[1 + (e*x)/d])/e + (b*n
*PolyLog[2, -((e*x)/d)])/e)/e))/d
```

3.109.3.1 Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2781
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + Simp[b*n*(p/(d*(q + 1)))   Int[(f*x)
^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b, c,
d, e, f, m, n, q}, x] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.109.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.52 (sec) , antiderivative size = 484, normalized size of antiderivative = 4.32

method	result
risch	$-\frac{b^2\ln(x^n)^2}{e^2(ex+d)}+\frac{b^2\ln(x^n)^2 d}{2e^2(ex+d)^2}-\frac{b^2 n\ln(x^n)}{e^2(ex+d)}-\frac{b^2 n\ln(x^n)\ln(ex+d)}{e^2 d}+\frac{b^2 n\ln(x^n)\ln(x)}{e^2 d}-\frac{b^2 n^2\ln(x)^2}{2e^2 d}-\frac{b^2 n^2\ln(ex+d)}{e^2 d}+b^2$

input
```
int(x*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2/e^2/(e*x+d)+1/2*b^2*ln(x^n)^2/e^2*d/(e*x+d)^2-b^2*n*ln(x^n)
/e^2/(e*x+d)-b^2*n*ln(x^n)/e^2/d*ln(e*x+d)+b^2*n*ln(x^n)/e^2/d*ln(x)-1/2*b
^2*n^2/e^2/d*ln(x)^2-b^2*n^2/e^2/d*ln(e*x+d)+b^2*n^2/e^2/d*ln(x)+b^2*n^2/e
^2/d*ln(e*x+d)*ln(-e*x/d)+b^2*n^2/e^2/d*dilog(-e*x/d)+(-I*b*Pi*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^
n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(-ln(x^n)/e^2/(
e*x+d)+1/2*ln(x^n)/e^2*d/(e*x+d)^2-1/2*n/e^2*(1/d*ln(e*x+d)+1/(e*x+d)-1/d*
ln(x)))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*
csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+
2*b*ln(c)+2*a)^2*(-1/e^2/(e*x+d)+1/2/e^2*d/(e*x+d)^2)
```

3.109.5 Fricas [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{(ex+d)^3}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^2*x*log(c*x^n)^2 + 2*a*b*x*log(c*x^n) + a^2*x)/(e^3*x^3 + 3*d*
e^2*x^2 + 3*d^2*e*x + d^3), x)
```

3.109.6 Sympy [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

output
```
Integral(x*(a + b*log(c*x**n))**2/(d + e*x)**3, x)
```

3.109.7 Maxima [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{(ex+d)^3}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
-a*b*n*(1/(e^3*x + d*e^2) + log(e*x + d)/(d*e^2) - log(x)/(d*e^2)) - 1/2*(
(2*e*x + d)*log(x^n)^2/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 2*integrate((e^2*
x^2*log(c)^2 + (3*d*e*n*x + d^2*n + 2*(e^2*n + e^2*log(c))*x^2)*log(x^n))/
(e^5*x^4 + 3*d*e^4*x^3 + 3*d^2*e^3*x^2 + d^3*e^2*x), x))*b^2 - (2*e*x + d)
*a*b*log(c*x^n)/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 1/2*(2*e*x + d)*a^2/(e^4
*x^2 + 2*d*e^3*x + d^2*e^2)
```

3.109.8 Giac [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2x}{(ex+d)^3}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x/(e*x + d)^3, x)
```

3.109.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^3}\,dx$$

input
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x)^3,x)
```

output
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x)^3, x)
```

3.110 $\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

3.110.1 Optimal result

Integrand size = 20, antiderivative size = 126

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = -\frac{bnx(a+b\log(cx^n))}{d^2(d+ex)} - \frac{bn\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{d^2e} - \frac{(a+b\log(cx^n))^2}{2e(d+ex)^2} + \frac{b^2n^2\log(d+ex)}{d^2e} + \frac{b^2n^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2e}$$

output
```
-b*n*x*(a+b*ln(c*x^n))/d^2/(e*x+d)-b*n*ln(1+d/e/x)*(a+b*ln(c*x^n))/d^2/e-1
/2*(a+b*ln(c*x^n))^2/e/(e*x+d)^2+b^2*n^2*ln(e*x+d)/d^2/e+b^2*n^2*polylog(2
,-d/e/x)/d^2/e
```

3.110.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 146, normalized size of antiderivative = 1.16

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = -\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2} + \frac{bn\left(\frac{a+b\log(cx^n)}{d(d+ex)} + \frac{(a+b\log(cx^n))^2}{2bd^2n} - \frac{bn\left(\frac{\log(x)}{d}-\frac{\log(d+ex)}{d}\right)}{d} - \frac{(a+b\log(cx^n))\log\left(\frac{d+ex}{d}\right)}{d^2} - \frac{bn\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2}\right)}{e}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(d + e*x)^3,x]
```

output
```
-1/2*(a + b*Log[c*x^n])^2/(e*(d + e*x)^2) + (b*n*((a + b*Log[c*x^n])/(d*(d
 + e*x)) + (a + b*Log[c*x^n])^2/(2*b*d^2*n) - (b*n*(Log[x]/d - Log[d + e*x
]/d))/d - ((a + b*Log[c*x^n])*Log[(d + e*x)/d])/d^2 - (b*n*PolyLog[2, -((e
*x)/d)])/d^2))/e
```

3.110.3 Rubi [A] (verified)

Time = 0.50 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.01, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {2756, 2789, 2751, 16, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{bn\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2789}$$

$$\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2751}$$

$$\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}$$

$$\Big\downarrow \text{16}$$

$$\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}$$

$$\Big\downarrow \text{2779}$$

$$\frac{bn\left(\frac{\frac{bn\int\frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}$$

$$\Big\downarrow \text{ 2838}$$

$$\frac{bn\left(\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}$$

input
```
Int[(a + b*Log[c*x^n])^2/(d + e*x)^3,x]
```

output
```
-1/2*(a + b*Log[c*x^n])^2/(e*(d + e*x)^2) + (b*n*(-((e*((x*(a + b*Log[c*x^
n]))/(d*(d + e*x)) - (b*n*Log[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*
(a + b*Log[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/d)/d))/e
```

3.110.3.1 Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.110.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.48 (sec) , antiderivative size = 435, normalized size of antiderivative = 3.45

method	result
risch	$-\frac{b^2 \ln(x^n)^2}{2e(ex+d)^2} - \frac{b^2 n \ln(x^n) \ln(ex+d)}{e\, d^2} + \frac{b^2 n \ln(x^n)}{ed(ex+d)} + \frac{b^2 n \ln(x^n) \ln(x)}{e\, d^2} - \frac{b^2 n^2 \ln(x)^2}{2e\, d^2} + \frac{b^2 n^2 \ln(ex+d)}{d^2 e} - \frac{b^2 n^2 \ln(x)}{e\, d^2} + \frac{b^2 n}{}$

input
```
int((a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b^2*ln(x^n)^2/e/(e*x+d)^2-b^2/e*n*ln(x^n)/d^2*ln(e*x+d)+b^2*n*ln(x^n)
/e/d/(e*x+d)+b^2/e*n*ln(x^n)/d^2*ln(x)-1/2*b^2/e*n^2/d^2*ln(x)^2+b^2*n^2*l
n(e*x+d)/d^2/e-b^2/e*n^2/d^2*ln(x)+b^2/e*n^2/d^2*ln(e*x+d)*ln(-e*x/d)+b^2/
e*n^2/d^2*dilog(-e*x/d)+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*P
i*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn
(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(-1/2*ln(x^n)/e/(e*x+d)^2+1/2/e*n*(-1/d^2*ln(
e*x+d)+1/d/(e*x+d)+1/d^2*ln(x)))-1/8*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^
2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2/(e*x+d)^2/e
```

3.110.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^3*x^3 + 3*d*e^2*x^
2 + 3*d^2*e*x + d^3), x)
```

3.110.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(d + e*x)**3, x)
```

3.110.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
a*b*n*(1/(d*e^2*x + d^2*e) - log(e*x + d)/(d^2*e) + log(x)/(d^2*e)) - 1/2*
b^2*(log(x^n)^2/(e^3*x^2 + 2*d*e^2*x + d^2*e) - 2*integrate((e*x*log(c)^2
+ (d*n + (e*n + 2*e*log(c))*x)*log(x^n))/(e^4*x^4 + 3*d*e^3*x^3 + 3*d^2*e^
2*x^2 + d^3*e*x), x)) - a*b*log(c*x^n)/(e^3*x^2 + 2*d*e^2*x + d^2*e) - 1/2
*a^2/(e^3*x^2 + 2*d*e^2*x + d^2*e)
```

3.110.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/(e*x + d)^3, x)
```

3.110.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}\,dx = \int \frac{(a+b\ln(c\,x^n))^2}{(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(d + e*x)^3,x)
```

output
```
int((a + b*log(c*x^n))^2/(d + e*x)^3, x)
```

3.111 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx$

3.111.1 Optimal result

Integrand size = 23, antiderivative size = 257

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx &= \frac{benx(a+b\log(cx^n))}{d^3(d+ex)}-\frac{(a+b\log(cx^n))^2}{2d^3}+\frac{(a+b\log(cx^n))^2}{2d(d+ex)^2}\\ &-\frac{ex(a+b\log(cx^n))^2}{d^3(d+ex)}+\frac{(a+b\log(cx^n))^3}{3bd^3n}\\ &-\frac{b^2n^2\log(d+ex)}{d^3}+\frac{3bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^3}\\ &-\frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^3}+\frac{3b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3}\\ &-\frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3}+\frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^3}\end{aligned}$$

output
```
b*e*n*x*(a+b*ln(c*x^n))/d^3/(e*x+d)-1/2*(a+b*ln(c*x^n))^2/d^3+1/2*(a+b*ln(
c*x^n))^2/d/(e*x+d)^2-e*x*(a+b*ln(c*x^n))^2/d^3/(e*x+d)+1/3*(a+b*ln(c*x^n)
)^3/b/d^3/n-b^2*n^2*ln(e*x+d)/d^3+3*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^3-(a
+b*ln(c*x^n))^2*ln(1+e*x/d)/d^3+3*b^2*n^2*polylog(2,-e*x/d)/d^3-2*b*n*(a+b
*ln(c*x^n))*polylog(2,-e*x/d)/d^3+2*b^2*n^2*polylog(3,-e*x/d)/d^3
```

3.111.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 232, normalized size of antiderivative = 0.90

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx$$
$$= \frac{-\frac{6bdn(a+b\log(cx^n))}{d+ex} - 9(a+b\log(cx^n))^2 + \frac{3d^2(a+b\log(cx^n))^2}{(d+ex)^2} + \frac{6d(a+b\log(cx^n))^2}{d+ex} + \frac{2(a+b\log(cx^n))^3}{bn} + 6b^2n^2(\log(x) -$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x)^3),x]
```

output
```
((-6*b*d*n*(a + b*Log[c*x^n]))/(d + e*x) - 9*(a + b*Log[c*x^n])^2 + (3*d^2
*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (6*d*(a + b*Log[c*x^n])^2)/(d + e*x)
+ (2*(a + b*Log[c*x^n])^3)/(b*n) + 6*b^2*n^2*(Log[x] - Log[d + e*x]) + 18*
b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 6*(a + b*Log[c*x^n])^2*Log[1 + (
e*x)/d] + 18*b^2*n^2*PolyLog[2, -((e*x)/d)] - 12*b*n*(a + b*Log[c*x^n])*Po
lyLog[2, -((e*x)/d)] + 12*b^2*n^2*PolyLog[3, -((e*x)/d)])/(6*d^3)
```

3.111.3 Rubi [A] (verified)

Time = 1.61 (sec) , antiderivative size = 293, normalized size of antiderivative = 1.14, number of steps used = 11, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 0.478$, Rules used = {2789, 2756, 2789, 2751, 16, 2755, 2754, 2779, 2821, 2838, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx$$
$$\Big\downarrow \ 2789$$
$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}dx}{d}$$
$$\Big\downarrow \ 2756$$
$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{d} - \frac{e\left(\frac{bn\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{e} - \frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$
$$\Big\downarrow \ 2789$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 2751

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 16

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 2755

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\int \frac{a+b\log(cx^n)}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 2754

3.111. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d} - \frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)} - \frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e} - \frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}}{d} - \frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d} - \frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)} - \frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e} - \frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 2779

$$\frac{\frac{\frac{2bn\int \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d} - \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d} - \frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)} - \frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e} - \frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}}{d} - \frac{e\left(\frac{bn\left(\frac{\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d} - \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d} - \frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)} - \frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e} - \frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 2821

$$\frac{\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n)) - bn\int \frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d} - \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d} - \frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)} - \frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e} - \cdots\right.}{d}\right.}{d}}{d} - \frac{e\left(\frac{bn\left(\frac{\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d} - \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d} - \frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)} - \frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e} - \frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$\Big\downarrow$ 2838

3.111. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx$

$$\frac{\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\right.}{d}\right.}{d}}{d}$$

$$\frac{e\left(\frac{bn\left(\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{ 7143}$$

$$\frac{\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\frac{bn\,\text{Pol}}{}\right.}{d}\right.}{d}}{d}$$

$$\frac{e\left(\frac{bn\left(\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x)^3),x]
```

output
```
-((e*(-1/2*(a + b*Log[c*x^n])^2/(e*(d + e*x)^2) + (b*n*(-((e*((x*(a + b*Lo
g[c*x^n]))/(d*(d + e*x)) - (b*n*Log[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(
e*x)]*(a + b*Log[c*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/d)/d))/e))/d)
+ (-((e*((x*(a + b*Log[c*x^n])^2)/(d*(d + e*x)) - (2*b*n*(((a + b*Log[c*x^
n])*Log[1 + (e*x)/d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e))/d))/d) + (-((Lo
g[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*x^n])*PolyL
og[2, -(d/(e*x))] + b*n*PolyLog[3, -(d/(e*x))]))/d)/d)/d
```

3.111. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx$

3.111.3.1 Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.111.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.52 (sec) , antiderivative size = 793, normalized size of antiderivative = 3.09

method	result	size
risch	Expression too large to display	793

input
```
int((a+b*ln(c*x^n))^2/x/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2/d^3*ln(e*x+d)+b^2*ln(x^n)^2/d^2/(e*x+d)+1/2*b^2*ln(x^n)^2/d
/(e*x+d)^2+b^2*ln(x^n)^2/d^3*ln(x)-b^2*n*ln(x^n)/d^2/(e*x+d)+3*b^2*n*ln(x^
n)/d^3*ln(e*x+d)-3*b^2*n*ln(x^n)/d^3*ln(x)-b^2*n^2*ln(e*x+d)/d^3+b^2/d^3*n
^2*ln(x)+3/2*b^2/d^3*n^2*ln(x)^2-3*b^2/d^3*n^2*ln(e*x+d)*ln(-e*x/d)-3*b^2/
d^3*n^2*dilog(-e*x/d)-b^2*n/d^3*ln(x^n)*ln(x)^2+1/3*b^2/d^3*ln(x)^3*n^2-2*
b^2/d^3*ln(e*x+d)*ln(-e*x/d)*ln(x)*n^2+2*b^2*n/d^3*ln(x^n)*ln(e*x+d)*ln(-e
*x/d)-2*b^2/d^3*dilog(-e*x/d)*ln(x)*n^2+2*b^2*n/d^3*ln(x^n)*dilog(-e*x/d)+
b^2/d^3*n^2*ln(e*x+d)*ln(x)^2-b^2/d^3*n^2*ln(x)^2*ln(1+e*x/d)-2*b^2/d^3*n^
2*ln(x)*polylog(2,-e*x/d)+2*b^2*n^2*polylog(3,-e*x/d)/d^3+(-I*b*Pi*csgn(I*
c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(
I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(-ln(x^n)/d
^3*ln(e*x+d)+ln(x^n)/d^2/(e*x+d)+1/2*ln(x^n)/d/(e*x+d)^2+ln(x^n)/d^3*ln(x)
-1/2*n*(1/d^2/(e*x+d)-3/d^3*ln(e*x+d)+3/d^3*ln(x)+1/d^3*ln(x)^2-2/d^3*ln(e
*x+d)*ln(-e*x/d)-2/d^3*dilog(-e*x/d)))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c
*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(-1/d^3*ln(e*x+d)+1/d^2/(e
*x+d)+1/2/d/(e*x+d)^2+1/d^3*ln(x))
```

3.111.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^3*x^4 + 3*d*e^2*x^
3 + 3*d^2*e*x^2 + d^3*x), x)
```

3.111.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx = \int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(e*x+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x*(d + e*x)**3), x)
```

3.111.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*a^2*((2*e*x + 3*d)/(d^2*e^2*x^2 + 2*d^3*e*x + d^4) - 2*log(e*x + d)/d^
3 + 2*log(x)/d^3) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c
) + 2*(b^2*log(c) + a*b)*log(x^n))/(e^3*x^4 + 3*d*e^2*x^3 + 3*d^2*e*x^2 +
d^3*x), x)
```

3.111.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^3*x), x)
```

3.111.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}\,dx = \int \frac{(a+b\ln(c\,x^n))^2}{x\,(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)^3),x)
```

output
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)^3), x)
```

3.112 $\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx$

3.112.1 Optimal result

Integrand size = 23, antiderivative size = 322

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx &= -\frac{2b^2n^2}{d^3x}-\frac{2bn(a+b\log(cx^n))}{d^3x}-\frac{be^2nx(a+b\log(cx^n))}{d^4(d+ex)}\\&+\frac{e(a+b\log(cx^n))^2}{2d^4}-\frac{(a+b\log(cx^n))^2}{d^3x}-\frac{e(a+b\log(cx^n))^2}{2d^2(d+ex)^2}\\&+\frac{2e^2x(a+b\log(cx^n))^2}{d^4(d+ex)}-\frac{e(a+b\log(cx^n))^3}{bd^4n}\\&+\frac{b^2en^2\log(d+ex)}{d^4}-\frac{5ben(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^4}\\&+\frac{3e(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^4}-\frac{5b^2en^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4}\\&+\frac{6ben(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4}\\&-\frac{6b^2en^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^4}\end{aligned}$$

output
```
-2*b^2*n^2/d^3/x-2*b*n*(a+b*ln(c*x^n))/d^3/x-b*e^2*n*x*(a+b*ln(c*x^n))/d^4
/(e*x+d)+1/2*e*(a+b*ln(c*x^n))^2/d^4-(a+b*ln(c*x^n))^2/d^3/x-1/2*e*(a+b*ln
(c*x^n))^2/d^2/(e*x+d)^2+2*e^2*x*(a+b*ln(c*x^n))^2/d^4/(e*x+d)-e*(a+b*ln(c
*x^n))^3/b/d^4/n+b^2*e*n^2*ln(e*x+d)/d^4-5*b*e*n*(a+b*ln(c*x^n))*ln(1+e*x/
d)/d^4+3*e*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/d^4-5*b^2*e*n^2*polylog(2,-e*x/d)
/d^4+6*b*e*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^4-6*b^2*e*n^2*polylog(3,-
e*x/d)/d^4
```

3.112.2 Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 290, normalized size of antiderivative = 0.90

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx =$$
$$-\frac{\frac{4b^2dn^2}{x}+\frac{4bdn(a+b\log(cx^n))}{x}-\frac{2bden(a+b\log(cx^n))}{d+ex}-5e(a+b\log(cx^n))^2+\frac{2d(a+b\log(cx^n))^2}{x}+\frac{d^2e(a+b\log(cx^n))^2}{(d+ex)^2}+4\cdots}{\cdots}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^3),x]
```

output
```
-1/2*((4*b^2*d*n^2)/x + (4*b*d*n*(a + b*Log[c*x^n]))/x - (2*b*d*e*n*(a + b
*Log[c*x^n]))/(d + e*x) - 5*e*(a + b*Log[c*x^n])^2 + (2*d*(a + b*Log[c*x^n
])^2)/x + (d^2*e*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (4*d*e*(a + b*Log[c*x
^n])^2)/(d + e*x) + (2*e*(a + b*Log[c*x^n])^3)/(b*n) + 2*b^2*e*n^2*(Log[x]
 - Log[d + e*x]) + 10*b*e*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 6*e*(a +
 b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 10*b^2*e*n^2*PolyLog[2, -((e*x)/d)] -
12*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 12*b^2*e*n^2*PolyLog[
3, -((e*x)/d)])/d^4
```

3.112.3 Rubi [A] (verified)

Time = 0.75 (sec) , antiderivative size = 335, normalized size of antiderivative = 1.04, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx$$
$$\Big\downarrow \; 2795$$
$$\int \left(\frac{2e^2(a+b\log(cx^n))^2}{d^3(d+ex)^2}-\frac{3e(a+b\log(cx^n))^2}{d^3x(d+ex)}+\frac{(a+b\log(cx^n))^2}{d^3x^2}+\frac{e^2(a+b\log(cx^n))^2}{d^2(d+ex)^3}\right)dx$$
$$\Big\downarrow \; 2009$$

$$\frac{2e^2x(a+b\log(cx^n))^2}{d^4(d+ex)} - \frac{be^2nx(a+b\log(cx^n))}{d^4(d+ex)} - \frac{6ben\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^4} + \frac{3e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^4} - \frac{ben\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d^4} - \frac{4ben\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^4} - \frac{(a+b\log(cx^n))^2}{d^3x} - \frac{2bn(a+b\log(cx^n))}{d^3x} - \frac{e(a+b\log(cx^n))^2}{2d^2(d+ex)^2} + \frac{b^2en^2\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^4} - \frac{4b^2en^2\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4} - \frac{6b^2en^2\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^4} + \frac{b^2en^2\log(d+ex)}{d^4} - \frac{2b^2n^2}{d^3x}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^3),x]
```

output
```
(-2*b^2*n^2)/(d^3*x) - (2*b*n*(a + b*Log[c*x^n]))/(d^3*x) - (b*e^2*n*x*(a
+ b*Log[c*x^n]))/(d^4*(d + e*x)) - (b*e*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^
n]))/d^4 - (a + b*Log[c*x^n])^2/(d^3*x) - (e*(a + b*Log[c*x^n])^2)/(2*d^2*
(d + e*x)^2) + (2*e^2*x*(a + b*Log[c*x^n])^2)/(d^4*(d + e*x)) + (3*e*Log[1
 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d^4 + (b^2*e*n^2*Log[d + e*x])/d^4 - (4*
b*e*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/d^4 + (b^2*e*n^2*PolyLog[2, -(d
/(e*x))])/d^4 - (6*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))])/d^4 -
(4*b^2*e*n^2*PolyLog[2, -((e*x)/d)])/d^4 - (6*b^2*e*n^2*PolyLog[3, -(d/(e*
x))])/d^4
```

3.112.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.112.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.50 (sec) , antiderivative size = 908, normalized size of antiderivative = 2.82

method	result	size
risch	Expression too large to display	908

input
```
int((a+b*ln(c*x^n))^2/x^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-2*b^2*n*ln(x^n)/d^3/x-b^2*ln(x^n)^2/d^3/x+6*b^2/d^4*e*ln(x)*ln(e*x+d)*ln(
-e*x/d)*n^2-6*b^2*n/d^4*e*ln(x^n)*ln(e*x+d)*ln(-e*x/d)-6*b^2*e*n^2*polylog
(3,-e*x/d)/d^4+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*
c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)
^3+2*b*ln(c)+2*a)*b*(-1/2*ln(x^n)/d^2/(e*x+d)^2*e+3*ln(x^n)/d^4*e*ln(e*x+d
)-2*ln(x^n)/d^3*e/(e*x+d)-ln(x^n)/d^3/x-3*ln(x^n)/d^4*e*ln(x)-1/2*n*(-3/d^
4*e*ln(x)^2+6/d^4*e*(dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))-1/d^3*e/(e*x+d)+5
/d^4*e*ln(e*x+d)+2/d^3/x-5/d^4*e*ln(x)))-2*b^2*ln(x^n)^2/d^3*e/(e*x+d)-1/2
*b^2*ln(x^n)^2/d^2/(e*x+d)^2*e-3*b^2*ln(x^n)^2/d^4*e*ln(x)-b^2/d^4*n^2*e*l
n(x)-5/2*b^2/d^4*n^2*e*ln(x)^2+5*b^2/d^4*n^2*e*dilog(-e*x/d)-b^2/d^4*e*ln(
x)^3*n^2+3*b^2*ln(x^n)^2/d^4*e*ln(e*x+d)+b^2*n*ln(x^n)/d^3*e/(e*x+d)+1/4*(
-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)
^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a
)^2*(-1/2/d^2/(e*x+d)^2*e+3/d^4*e*ln(e*x+d)-2/d^3*e/(e*x+d)-1/d^3/x-3/d^4*
e*ln(x))+6*b^2/d^4*e*ln(x)*dilog(-e*x/d)*n^2-6*b^2*n/d^4*e*ln(x^n)*dilog(-
e*x/d)-3*b^2/d^4*e*n^2*ln(e*x+d)*ln(x)^2+3*b^2/d^4*e*n^2*ln(x)^2*ln(1+e*x/
d)+6*b^2/d^4*e*n^2*ln(x)*polylog(2,-e*x/d)-5*b^2*n*ln(x^n)/d^4*e*ln(e*x+d)
+5*b^2*n*ln(x^n)/d^4*e*ln(x)+5*b^2/d^4*n^2*e*ln(e*x+d)*ln(-e*x/d)+3*b^2*n/
d^4*e*ln(x^n)*ln(x)^2+b^2*e*n^2*ln(e*x+d)/d^4-2*b^2*n^2/d^3/x
```

3.112.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^3*x^5 + 3*d*e^2*x^
4 + 3*d^2*e*x^3 + d^3*x^2), x)
```

3.112.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx = \int \frac{(a+b\log(cx^n))^2}{x^2\,(d+ex)^3}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**2/(e*x+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**2*(d + e*x)**3), x)
```

3.112.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
-1/2*a^2*((6*e^2*x^2 + 9*d*e*x + 2*d^2)/(d^3*e^2*x^3 + 2*d^4*e*x^2 + d^5*x
) - 6*e*log(e*x + d)/d^4 + 6*e*log(x)/d^4) + integrate((b^2*log(c)^2 + b^2
*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e^3*x^5 + 3*d
*e^2*x^4 + 3*d^2*e*x^3 + d^3*x^2), x)
```

3.112.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^3x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^3*x^2), x)
```

3.112.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^3}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x^2\,(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^3),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^3), x)
```

3.113 $\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4} dx$

3.113.1 Optimal result

Integrand size = 23, antiderivative size = 398

$$\begin{aligned}\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4} dx = &-\frac{2abnx}{e^4}+\frac{2b^2n^2x}{e^4}-\frac{b^2d^2n^2}{3e^5(d+ex)}-\frac{b^2dn^2\log(x)}{3e^5} \\ &-\frac{2b^2nx\log(cx^n)}{e^4}+\frac{bd^3n(a+b\log(cx^n))}{3e^5(d+ex)^2} \\ &+\frac{10bdnx(a+b\log(cx^n))}{3e^4(d+ex)}-\frac{5d(a+b\log(cx^n))^2}{3e^5} \\ &+\frac{x(a+b\log(cx^n))^2}{e^4}-\frac{d^4(a+b\log(cx^n))^2}{3e^5(d+ex)^3} \\ &+\frac{2d^3(a+b\log(cx^n))^2}{e^5(d+ex)^2}+\frac{6dx(a+b\log(cx^n))^2}{e^4(d+ex)} \\ &-\frac{3b^2dn^2\log(d+ex)}{e^5}-\frac{26bdn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3e^5} \\ &-\frac{4d(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^5}-\frac{26b^2dn^2\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{3e^5} \\ &-\frac{8bdn(a+b\log(cx^n))\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^5} \\ &+\frac{8b^2dn^2\,\mathrm{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^5}\end{aligned}$$

output
```
-2*a*b*n*x/e^4+2*b^2*n^2*x/e^4-1/3*b^2*d^2*n^2/e^5/(e*x+d)-1/3*b^2*d*n^2*l
n(x)/e^5-2*b^2*n*x*ln(c*x^n)/e^4+1/3*b*d^3*n*(a+b*ln(c*x^n))/e^5/(e*x+d)^2
+10/3*b*d*n*x*(a+b*ln(c*x^n))/e^4/(e*x+d)-5/3*d*(a+b*ln(c*x^n))^2/e^5+x*(a
+b*ln(c*x^n))^2/e^4-1/3*d^4*(a+b*ln(c*x^n))^2/e^5/(e*x+d)^3+2*d^3*(a+b*ln(
c*x^n))^2/e^5/(e*x+d)^2+6*d*x*(a+b*ln(c*x^n))^2/e^4/(e*x+d)-3*b^2*d*n^2*ln
(e*x+d)/e^5-26/3*b*d*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^5-4*d*(a+b*ln(c*x^n))
^2*ln(1+e*x/d)/e^5-26/3*b^2*d*n^2*polylog(2,-e*x/d)/e^5-8*b*d*n*(a+b*ln(c*
x^n))*polylog(2,-e*x/d)/e^5+8*b^2*d*n^2*polylog(3,-e*x/d)/e^5
```

3.113.2 Mathematica [A] (verified)

Time = 0.44 (sec) , antiderivative size = 344, normalized size of antiderivative = 0.86

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = -\frac{-\frac{bd^3n(a+b\log(cx^n))}{(d+ex)^2}+\frac{10bd^2n(a+b\log(cx^n))}{d+ex}-13d(a+b\log(cx^n))^2-3ex(a+b\log(cx^n))^2+\frac{d^4(a+b\log(cx^n))^2}{(d+ex)^3}-}{}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
-1/3*(-((b*d^3*n*(a + b*Log[c*x^n]))/(d + e*x)^2) + (10*b*d^2*n*(a + b*Log
[c*x^n]))/(d + e*x) - 13*d*(a + b*Log[c*x^n])^2 - 3*e*x*(a + b*Log[c*x^n])
^2 + (d^4*(a + b*Log[c*x^n])^2)/(d + e*x)^3 - (6*d^3*(a + b*Log[c*x^n])^2)
/(d + e*x)^2 + (18*d^2*(a + b*Log[c*x^n])^2)/(d + e*x) + 6*b*e*n*x*(a - b*
n + b*Log[c*x^n]) - 10*b^2*d*n^2*(Log[x] - Log[d + e*x]) + (b^2*d*n^2*(d +
 (d + e*x)*Log[x] - (d + e*x)*Log[d + e*x]))/(d + e*x) + 26*b*d*n*(a + b*L
og[c*x^n])*Log[1 + (e*x)/d] + 12*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] +
 26*b^2*d*n^2*PolyLog[2, -((e*x)/d)] + 24*b*d*n*(a + b*Log[c*x^n])*PolyLog
[2, -((e*x)/d)] - 24*b^2*d*n^2*PolyLog[3, -((e*x)/d)])/e^5
```

3.113.3 Rubi [A] (verified)

Time = 0.99 (sec) , antiderivative size = 430, normalized size of antiderivative = 1.08, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

3.113. $\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

$\Big\downarrow$ 2795

$$\int \left(\frac{d^4(a+b\log(cx^n))^2}{e^4(d+ex)^4}-\frac{4d^3(a+b\log(cx^n))^2}{e^4(d+ex)^3}+\frac{6d^2(a+b\log(cx^n))^2}{e^4(d+ex)^2}-\frac{4d(a+b\log(cx^n))^2}{e^4(d+ex)}+\frac{(a+b\log(cx^n)}{e^4}\right.$$

$\Big\downarrow$ 2009

$$-\frac{d^4(a+b\log(cx^n))^2}{3e^5(d+ex)^3}+\frac{2d^3(a+b\log(cx^n))^2}{e^5(d+ex)^2}+\frac{bd^3n(a+b\log(cx^n))}{3e^5(d+ex)^2}-\frac{8bdn\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^5}+\frac{10bdn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{3e^5}-\frac{4d\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^5}-\frac{12bdn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^5}+\frac{6dx(a+b\log(cx^n))^2}{e^4(d+ex)}+\frac{10bdnx(a+b\log(cx^n))}{3e^4(d+ex)}+\frac{x(a+b\log(cx^n))^2}{e^4}-\frac{2abnx}{e^4}-\frac{2b^2nx\log(cx^n)}{e^4}-\frac{b^2d^2n^2}{3e^5(d+ex)}-\frac{10b^2dn^2\,\mathrm{PolyLog}\left(2,-\frac{d}{ex}\right)}{3e^5}-\frac{12b^2dn^2\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^5}+\frac{8b^2dn^2\,\mathrm{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^5}-\frac{b^2dn^2\log(x)}{3e^5}-\frac{3b^2dn^2\log(d+ex)}{e^5}+\frac{2b^2n^2x}{e^4}$$

input
```
Int[(x^4*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
(-2*a*b*n*x)/e^4 + (2*b^2*n^2*x)/e^4 - (b^2*d^2*n^2)/(3*e^5*(d + e*x)) - (
b^2*d*n^2*Log[x])/(3*e^5) - (2*b^2*n*x*Log[c*x^n])/e^4 + (b*d^3*n*(a + b*L
og[c*x^n]))/(3*e^5*(d + e*x)^2) + (10*b*d*n*x*(a + b*Log[c*x^n]))/(3*e^4*(
d + e*x)) + (10*b*d*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/(3*e^5) + (x*(a
 + b*Log[c*x^n])^2)/e^4 - (d^4*(a + b*Log[c*x^n])^2)/(3*e^5*(d + e*x)^3) +
 (2*d^3*(a + b*Log[c*x^n])^2)/(e^5*(d + e*x)^2) + (6*d*x*(a + b*Log[c*x^n]
)^2)/(e^4*(d + e*x)) - (3*b^2*d*n^2*Log[d + e*x])/e^5 - (12*b*d*n*(a + b*L
og[c*x^n])*Log[1 + (e*x)/d])/e^5 - (4*d*(a + b*Log[c*x^n])^2*Log[1 + (e*x)
/d])/e^5 - (10*b^2*d*n^2*PolyLog[2, -(d/(e*x))])/(3*e^5) - (12*b^2*d*n^2*P
olyLog[2, -((e*x)/d)])/e^5 - (8*b*d*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x
)/d)])/e^5 + (8*b^2*d*n^2*PolyLog[3, -((e*x)/d)])/e^5
```

3.113. $\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

3.113.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.113.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.56 (sec) , antiderivative size = 943, normalized size of antiderivative = 2.37

method	result	size
risch	Expression too large to display	943

input
```
int(x^4*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-6*b^2*ln(x^n)^2/e^5*d^2/(e*x+d)+2*b^2*ln(x^n)^2/e^5*d^3/(e*x+d)^2-2*b^2*n
*ln(x^n)*x/e^4-13/3*b^2/e^5*n^2*d*ln(x)^2+26/3*b^2/e^5*n^2*dilog(-e*x/d)*d
-1/3*b^2*ln(x^n)^2*d^4/e^5/(e*x+d)^3-4*b^2*ln(x^n)^2/e^5*d*ln(e*x+d)-8*b^2
/e^5*d*n^2*ln(x)*polylog(2,-e*x/d)+1/3*b^2*n*ln(x^n)/e^5*d^3/(e*x+d)^2-26/
3*b^2*n*ln(x^n)/e^5*d*ln(e*x+d)-10/3*b^2*n*ln(x^n)/e^5*d^2/(e*x+d)+(-I*b*P
i*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b
*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(l
n(x^n)*x/e^4-1/3*ln(x^n)*d^4/e^5/(e*x+d)^3-4*ln(x^n)/e^5*d*ln(e*x+d)-6*ln(
x^n)/e^5*d^2/(e*x+d)+2*ln(x^n)/e^5*d^3/(e*x+d)^2-1/3*n*(1/e^5*(3*e*x+3*d-1
/2*d^3/(e*x+d)^2+13*d*ln(e*x+d)+5*d^2/(e*x+d)-13*d*ln(e*x))-12/e^5*d*(dilo
g(-e*x/d)+ln(e*x+d)*ln(-e*x/d))))-1/3*b^2*d^2*n^2/e^5/(e*x+d)+3*b^2*d*n^2*
ln(x)/e^5-3*b^2*d*n^2*ln(e*x+d)/e^5+8*b^2*d*n^2*polylog(3,-e*x/d)/e^5+1/4*
(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n
)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*
a)^2*(x/e^4-1/3/e^5*d^4/(e*x+d)^3-4/e^5*d*ln(e*x+d)-6/e^5*d^2/(e*x+d)+2/e^
5*d^3/(e*x+d)^2)+b^2*ln(x^n)^2*x/e^4+26/3*b^2*n/e^5*ln(x)*ln(x^n)*d+26/3*b
^2/e^5*n^2*ln(e*x+d)*ln(-e*x/d)*d-8*b^2/e^5*d*ln(x)*dilog(-e*x/d)*n^2+8*b^
2*n/e^5*d*ln(x^n)*dilog(-e*x/d)+4*b^2/e^5*d*n^2*ln(e*x+d)*ln(x)^2-4*b^2/e^
5*d*n^2*ln(x)^2*ln(1+e*x/d)-8*b^2/e^5*d*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2+8*b
^2*n/e^5*d*ln(x^n)*ln(e*x+d)*ln(-e*x/d)+2*b^2*n^2*x/e^4
```

3.113.5 Fricas [F]

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x^4}{(ex+d)^4}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*x^4*log(c*x^n)^2 + 2*a*b*x^4*log(c*x^n) + a^2*x^4)/(e^4*x^4
+ 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

3.113.6 Sympy [F]

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

input
```
integrate(x**4*(a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

output
```
Integral(x**4*(a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

3.113.7 Maxima [F]

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x^4}{(ex+d)^4}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/3*a^2*((18*d^2*e^2*x^2 + 30*d^3*e*x + 13*d^4)/(e^8*x^3 + 3*d*e^7*x^2 +
3*d^2*e^6*x + d^3*e^5) - 3*x/e^4 + 12*d*log(e*x + d)/e^5) + integrate((b^2
*x^4*log(x^n)^2 + 2*(b^2*log(c) + a*b)*x^4*log(x^n) + (b^2*log(c)^2 + 2*a*
b*log(c))*x^4)/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4),
x)
```

3.113.8 Giac [F]

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x^4}{(ex+d)^4}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^4/(e*x + d)^4, x)
```

3.113.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^4(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{x^4\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^4}\,dx$$

input
```
int((x^4*(a + b*log(c*x^n))^2)/(d + e*x)^4,x)
```

output
```
int((x^4*(a + b*log(c*x^n))^2)/(d + e*x)^4, x)
```

3.114 $\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

3.114.1 Optimal result

Integrand size = 23, antiderivative size = 333

$$\begin{aligned}\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = {} & \frac{b^2dn^2}{3e^4(d+ex)}+\frac{b^2n^2\log(x)}{3e^4}-\frac{bd^2n(a+b\log(cx^n))}{3e^4(d+ex)^2} \\ & -\frac{7bnx(a+b\log(cx^n))}{3e^3(d+ex)}+\frac{7(a+b\log(cx^n))^2}{6e^4} \\ & +\frac{d^3(a+b\log(cx^n))^2}{3e^4(d+ex)^3}-\frac{3d^2(a+b\log(cx^n))^2}{2e^4(d+ex)^2} \\ & -\frac{3x(a+b\log(cx^n))^2}{e^3(d+ex)}+\frac{2b^2n^2\log(d+ex)}{e^4} \\ & +\frac{11bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3e^4} \\ & +\frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{e^4}+\frac{11b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{3e^4} \\ & +\frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4} \\ & -\frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}\end{aligned}$$

output
```
1/3*b^2*d*n^2/e^4/(e*x+d)+1/3*b^2*n^2*ln(x)/e^4-1/3*b*d^2*n*(a+b*ln(c*x^n)
)/e^4/(e*x+d)^2-7/3*b*n*x*(a+b*ln(c*x^n))/e^3/(e*x+d)+7/6*(a+b*ln(c*x^n))^
2/e^4+1/3*d^3*(a+b*ln(c*x^n))^2/e^4/(e*x+d)^3-3/2*d^2*(a+b*ln(c*x^n))^2/e^
4/(e*x+d)^2-3*x*(a+b*ln(c*x^n))^2/e^3/(e*x+d)+2*b^2*n^2*ln(e*x+d)/e^4+11/3
*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/e^4+(a+b*ln(c*x^n))^2*ln(1+e*x/d)/e^4+11/
3*b^2*n^2*polylog(2,-e*x/d)/e^4+2*b*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/e^
4-2*b^2*n^2*polylog(3,-e*x/d)/e^4
```

3.114.2 Mathematica [A] (verified)

Time = 0.32 (sec) , antiderivative size = 298, normalized size of antiderivative = 0.89

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$
$$= \frac{-\frac{2bd^2n(a+b\log(cx^n))}{(d+ex)^2}+\frac{14bdn(a+b\log(cx^n))}{d+ex}-11(a+b\log(cx^n))^2+\frac{2d^3(a+b\log(cx^n))^2}{(d+ex)^3}-\frac{9d^2(a+b\log(cx^n))^2}{(d+ex)^2}+\frac{18d(a+b\log}{d+e}}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
((-2*b*d^2*n*(a + b*Log[c*x^n]))/(d + e*x)^2 + (14*b*d*n*(a + b*Log[c*x^n]
))/(d + e*x) - 11*(a + b*Log[c*x^n])^2 + (2*d^3*(a + b*Log[c*x^n])^2)/(d +
 e*x)^3 - (9*d^2*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (18*d*(a + b*Log[c*x^
n])^2)/(d + e*x) - 14*b^2*n^2*(Log[x] - Log[d + e*x]) + (2*b^2*n^2*(d + (d
 + e*x)*Log[x] - (d + e*x)*Log[d + e*x]))/(d + e*x) + 22*b*n*(a + b*Log[c*
x^n])*Log[1 + (e*x)/d] + 6*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 22*b^2*
n^2*PolyLog[2, -((e*x)/d)] + 12*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/
d)] - 12*b^2*n^2*PolyLog[3, -((e*x)/d)])/(6*e^4)
```

3.114.3 Rubi [A] (verified)

Time = 0.92 (sec) , antiderivative size = 364, normalized size of antiderivative = 1.09, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$
$$\Big\downarrow \text{2795}$$
$$\int \left(-\frac{d^3(a+b\log(cx^n))^2}{e^3(d+ex)^4}+\frac{3d^2(a+b\log(cx^n))^2}{e^3(d+ex)^3}-\frac{3d(a+b\log(cx^n))^2}{e^3(d+ex)^2}+\frac{(a+b\log(cx^n))^2}{e^3(d+ex)}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{d^3(a+b\log(cx^n))^2}{3e^4(d+ex)^3}-\frac{3d^2(a+b\log(cx^n))^2}{2e^4(d+ex)^2}-\frac{bd^2n(a+b\log(cx^n))}{3e^4(d+ex)^2}+\frac{2bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))}{e^4}-\frac{7bn\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{3e^4}+\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e^4}+\frac{6bn\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e^4}-\frac{3x(a+b\log(cx^n))^2}{e^3(d+ex)}-\frac{7bnx(a+b\log(cx^n))}{3e^3(d+ex)}+\frac{7b^2n^2\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{3e^4}+\frac{6b^2n^2\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e^4}-\frac{2b^2n^2\,\text{PolyLog}\left(3,-\frac{ex}{d}\right)}{e^4}+\frac{b^2dn^2}{3e^4(d+ex)}+\frac{2b^2n^2\log(d+ex)}{e^4}+\frac{b^2n^2\log(x)}{3e^4}$$

input
```
Int[(x^3*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
(b^2*d*n^2)/(3*e^4*(d + e*x)) + (b^2*n^2*Log[x])/(3*e^4) - (b*d^2*n*(a + b
*Log[c*x^n]))/(3*e^4*(d + e*x)^2) - (7*b*n*x*(a + b*Log[c*x^n]))/(3*e^3*(d
 + e*x)) - (7*b*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/(3*e^4) + (d^3*(a +
 b*Log[c*x^n])^2)/(3*e^4*(d + e*x)^3) - (3*d^2*(a + b*Log[c*x^n])^2)/(2*e^
4*(d + e*x)^2) - (3*x*(a + b*Log[c*x^n])^2)/(e^3*(d + e*x)) + (2*b^2*n^2*L
og[d + e*x])/e^4 + (6*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/e^4 + ((a +
 b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e^4 + (7*b^2*n^2*PolyLog[2, -(d/(e*x))]
)/(3*e^4) + (6*b^2*n^2*PolyLog[2, -((e*x)/d)])/e^4 + (2*b*n*(a + b*Log[c*x
^n])*PolyLog[2, -((e*x)/d)])/e^4 - (2*b^2*n^2*PolyLog[3, -((e*x)/d)])/e^4
```

3.114. $\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

3.114.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.114.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.60 (sec) , antiderivative size = 854, normalized size of antiderivative = 2.56

method	result	size
risch	Expression too large to display	854

input
```
int(x^3*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
1/3*b^2*ln(x^n)^2/e^4*d^3/(e*x+d)^3+b^2*ln(x^n)^2/e^4*ln(e*x+d)+3*b^2*ln(x
^n)^2/e^4*d/(e*x+d)-3/2*b^2*ln(x^n)^2/e^4*d^2/(e*x+d)^2+7/3*b^2*n*ln(x^n)/
e^4*d/(e*x+d)-1/3*b^2*n*ln(x^n)/e^4*d^2/(e*x+d)^2+11/3*b^2*n*ln(x^n)/e^4*l
n(e*x+d)-11/3*b^2*n/e^4*ln(x^n)*ln(x)+11/6*b^2/e^4*n^2*ln(x)^2-11/3*b^2/e^
4*n^2*ln(e*x+d)*ln(-e*x/d)-11/3*b^2/e^4*n^2*dilog(-e*x/d)+1/3*b^2*d*n^2/e^
4/(e*x+d)+2*b^2*n^2*ln(e*x+d)/e^4-2*b^2*n^2*ln(x)/e^4+2*b^2/e^4*ln(x)*ln(e
*x+d)*ln(-e*x/d)*n^2+2*b^2/e^4*ln(x)*dilog(-e*x/d)*n^2-2*b^2*n/e^4*ln(x^n)
*ln(e*x+d)*ln(-e*x/d)-2*b^2*n/e^4*ln(x^n)*dilog(-e*x/d)-b^2/e^4*n^2*ln(e*x
+d)*ln(x)^2+b^2/e^4*n^2*ln(x)^2*ln(1+e*x/d)+2*b^2/e^4*n^2*ln(x)*polylog(2,
-e*x/d)-2*b^2*n^2*polylog(3,-e*x/d)/e^4+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^
n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(1/3*ln(x^n)/e^4*d^3/(e*x+d)^
3+ln(x^n)/e^4*ln(e*x+d)+3*ln(x^n)/e^4*d/(e*x+d)-3/2*ln(x^n)/e^4*d^2/(e*x+d
)^2-1/6*n*(-7/e^4*d/(e*x+d)-11/e^4*ln(e*x+d)+1/e^4*d^2/(e*x+d)^2+11/e^4*ln
(e*x)+6/e^4*ln(e*x+d)*ln(-e*x/d)+6/e^4*dilog(-e*x/d)))+1/4*(-I*b*Pi*csgn(I
*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn
(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(1/3/e^4*d
^3/(e*x+d)^3+1/e^4*ln(e*x+d)+3/e^4*d/(e*x+d)-3/2/e^4*d^2/(e*x+d)^2)
```

3.114.5 Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^4}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*x^3*log(c*x^n)^2 + 2*a*b*x^3*log(c*x^n) + a^2*x^3)/(e^4*x^4
+ 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

3.114.6 Sympy [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

3.114.7 Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^4}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*a^2*((18*d*e^2*x^2 + 27*d^2*e*x + 11*d^3)/(e^7*x^3 + 3*d*e^6*x^2 + 3*d
^2*e^5*x + d^3*e^4) + 6*log(e*x + d)/e^4) + integrate((b^2*x^3*log(x^n)^2
+ 2*(b^2*log(c) + a*b)*x^3*log(x^n) + (b^2*log(c)^2 + 2*a*b*log(c))*x^3)/(
e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

3.114.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx=\int \frac{(b\log(cx^n)+a)^2x^3}{(ex+d)^4}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^3/(e*x + d)^4, x)
```

3.114.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))^2}{(d+ex)^4}\,dx=\int \frac{x^3\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^4}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^4,x)
```

output
```
int((x^3*(a + b*log(c*x^n))^2)/(d + e*x)^4, x)
```

3.115 $\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

3.115.1 Optimal result

Integrand size = 23, antiderivative size = 161

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \frac{bnx^2(a+b\log(cx^n))}{3de(d+ex)^2} + \frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3} + \frac{bnx(2a+bn+2b\log(cx^n))}{3de^2(d+ex)} - \frac{bn(2a+3bn+2b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3de^3} - \frac{2b^2n^2\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{3de^3}$$

output
```
1/3*b*n*x^2*(a+b*ln(c*x^n))/d/e/(e*x+d)^2+1/3*x^3*(a+b*ln(c*x^n))^2/d/(e*x
+d)^3+1/3*b*n*x*(2*a+b*n+2*b*ln(c*x^n))/d/e^2/(e*x+d)-1/3*b*n*(2*a+3*b*n+2
*b*ln(c*x^n))*ln(1+e*x/d)/d/e^3-2/3*b^2*n^2*polylog(2,-e*x/d)/d/e^3
```

3.115.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 371 vs. 2(161) = 322.

Time = 0.32 (sec) , antiderivative size = 371, normalized size of antiderivative = 2.30

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx =$$

$$-\frac{-\frac{a^2}{d}+\frac{a^2d^2}{(d+ex)^3}-\frac{3a^2d}{(d+ex)^2}-\frac{abdn}{(d+ex)^2}+\frac{3a^2}{d+ex}+\frac{4abn}{d+ex}+\frac{b^2n^2}{d+ex}-\frac{3b^2n^2\log(x)}{d}-\frac{2ab\log(cx^n)}{d}+\frac{2abd^2\log(cx^n)}{(d+ex)^3}-\frac{6abd\log}{(d+e}}{}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
-1/3*(-(a^2/d) + (a^2*d^2)/(d + e*x)^3 - (3*a^2*d)/(d + e*x)^2 - (a*b*d*n)
/(d + e*x)^2 + (3*a^2)/(d + e*x) + (4*a*b*n)/(d + e*x) + (b^2*n^2)/(d + e*
x) - (3*b^2*n^2*Log[x])/d - (2*a*b*Log[c*x^n])/d + (2*a*b*d^2*Log[c*x^n])/
(d + e*x)^3 - (6*a*b*d*Log[c*x^n])/(d + e*x)^2 - (b^2*d*n*Log[c*x^n])/(d +
 e*x)^2 + (6*a*b*Log[c*x^n])/(d + e*x) + (4*b^2*n*Log[c*x^n])/(d + e*x) -
(b^2*Log[c*x^n]^2)/d + (b^2*d^2*Log[c*x^n]^2)/(d + e*x)^3 - (3*b^2*d*Log[c
*x^n]^2)/(d + e*x)^2 + (3*b^2*Log[c*x^n]^2)/(d + e*x) + (3*b^2*n^2*Log[d +
 e*x])/d + (2*a*b*n*Log[1 + (e*x)/d])/d + (2*b^2*n*Log[c*x^n]*Log[1 + (e*x
)/d])/d + (2*b^2*n^2*PolyLog[2, -((e*x)/d)])/d)/e^3
```

3.115.3 Rubi [A] (verified)

Time = 0.54 (sec) , antiderivative size = 155, normalized size of antiderivative = 0.96, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.217, Rules used = {2781, 2784, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}dx$$

$$\Big\downarrow \text{2781}$$

$$\frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3}-\frac{2bn\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^3}dx}{3d}$$

$$\Big\downarrow \text{2784}$$

$$\frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3}-\frac{2bn\left(\frac{\int \frac{x(2a+bn+2b\log(cx^n))}{(d+ex)^2}dx}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}\right)}{3d}$$

$$\Big\downarrow \text{2784}$$

$$\frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3}-\frac{2bn\left(\frac{\frac{\int \frac{2a+3bn+2b\log(cx^n)}{d+ex}dx}{e}-\frac{x(2a+2b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}\right)}{3d}$$

$$\Big\downarrow \text{2754}$$

$$\frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3}-\frac{2bn\left(\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(2a+2b\log(cx^n)+3bn)}{e}-\frac{2bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x(2a+2b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}\right)}{3d}$$

$$\Big\downarrow \; 2838$$

$$\frac{x^3(a+b\log(cx^n))^2}{3d(d+ex)^3}-\frac{2bn\left(\frac{\frac{\frac{\log\left(\frac{ex}{d}+1\right)(2a+2b\log(cx^n)+3bn)}{e}+\frac{2bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e}-\frac{x(2a+2b\log(cx^n)+bn)}{e(d+ex)}}{2e}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex)^2}\right)}{3d}$$

input

```
Int[(x^2*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output

```
(x^3*(a + b*Log[c*x^n])^2)/(3*d*(d + e*x)^3) - (2*b*n*(-1/2*(x^2*(a + b*Lo
g[c*x^n]))/(e*(d + e*x)^2) + (-((x*(2*a + b*n + 2*b*Log[c*x^n]))/(e*(d + e
*x))) + (((2*a + 3*b*n + 2*b*Log[c*x^n])*Log[1 + (e*x)/d])/e + (2*b*n*Poly
Log[2, -((e*x)/d)])/e)/e)/(2*e)))/(3*d)
```

3.115.3.1 Defintions of rubi rules used

rule 2754

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2781

```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + Simp[b*n*(p/(d*(q + 1)))   Int[(f*x)
^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b, c,
d, e, f, m, n, q}, x] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

3.115. $\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.115.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.52 (sec) , antiderivative size = 593, normalized size of antiderivative = 3.68

method	result
risch	$-\frac{b^2 \ln(x^n)^2 d^2}{3e^3(ex+d)^3}-\frac{b^2 \ln(x^n)^2}{e^3(ex+d)}+\frac{b^2 \ln(x^n)^2 d}{e^3(ex+d)^2}-\frac{4b^2 n \ln(x^n)}{3e^3(ex+d)}+\frac{b^2 n \ln(x^n) d}{3e^3(ex+d)^2}-\frac{2b^2 n \ln(x^n)\ln(ex+d)}{3e^3 d}+\frac{2b^2 n \ln(x^n)\ln(x)}{3e^3 d}-$

input
```
int(x^2*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-1/3*b^2*ln(x^n)^2/e^3*d^2/(e*x+d)^3-b^2*ln(x^n)^2/e^3/(e*x+d)+b^2*ln(x^n)
^2/e^3*d/(e*x+d)^2-4/3*b^2*n*ln(x^n)/e^3/(e*x+d)+1/3*b^2*n*ln(x^n)/e^3*d/(
e*x+d)^2-2/3*b^2*n*ln(x^n)/e^3/d*ln(e*x+d)+2/3*b^2*n*ln(x^n)/e^3/d*ln(x)-1
/3*b^2*n^2/e^3/d*ln(x)^2+2/3*b^2*n^2/e^3/d*ln(e*x+d)*ln(-e*x/d)+2/3*b^2*n^
2/e^3/d*dilog(-e*x/d)-1/3*b^2*n^2/e^3/(e*x+d)-b^2*n^2/e^3/d*ln(e*x+d)+b^2*
n^2/e^3/d*ln(x)+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I
*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n
)^3+2*b*ln(c)+2*a)*b*(-1/3*ln(x^n)/e^3*d^2/(e*x+d)^3-ln(x^n)/e^3/(e*x+d)+l
n(x^n)/e^3*d/(e*x+d)^2-1/3*n/e^3*(-1/2*d/(e*x+d)^2+1/d*ln(e*x+d)+2/(e*x+d)
-1/d*ln(x)))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(
I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^
n)^3+2*b*ln(c)+2*a)^2*(-1/3/e^3*d^2/(e*x+d)^3-1/e^3/(e*x+d)+1/e^3*d/(e*x+d
)^2)
```

3.115.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^4}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*x^2*log(c*x^n)^2 + 2*a*b*x^2*log(c*x^n) + a^2*x^2)/(e^4*x^4
+ 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

3.115.6 Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

3.115.7 Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^4}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/3*a*b*n*((4*e*x + 3*d)/(e^5*x^2 + 2*d*e^4*x + d^2*e^3) + 2*log(e*x + d)
/(d*e^3) - 2*log(x)/(d*e^3)) - 1/3*((3*e^2*x^2 + 3*d*e*x + d^2)*log(x^n)^2
/(e^6*x^3 + 3*d*e^5*x^2 + 3*d^2*e^4*x + d^3*e^3) - 3*integrate(1/3*(3*e^3*
x^3*log(c)^2 + 2*(6*d*e^2*n*x^2 + 4*d^2*e*n*x + d^3*n + 3*(e^3*n + e^3*log
(c))*x^3)*log(x^n))/(e^7*x^5 + 4*d*e^6*x^4 + 6*d^2*e^5*x^3 + 4*d^3*e^4*x^2
 + d^4*e^3*x), x))*b^2 - 2/3*(3*e^2*x^2 + 3*d*e*x + d^2)*a*b*log(c*x^n)/(e
^6*x^3 + 3*d*e^5*x^2 + 3*d^2*e^4*x + d^3*e^3) - 1/3*(3*e^2*x^2 + 3*d*e*x +
 d^2)*a^2/(e^6*x^3 + 3*d*e^5*x^2 + 3*d^2*e^4*x + d^3*e^3)
```

3.115.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx=\int \frac{(b\log(cx^n)+a)^2x^2}{(ex+d)^4}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x^2/(e*x + d)^4, x)
```

3.115.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))^2}{(d+ex)^4}\,dx=\int \frac{x^2\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^4}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^4,x)
```

output
```
int((x^2*(a + b*log(c*x^n))^2)/(d + e*x)^4, x)
```

3.116 $\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

3.116.1 Optimal result

Integrand size = 21, antiderivative size = 210

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \frac{b^2n^2}{3de^2(d+ex)} - \frac{bn(a+b\log(cx^n))}{3e^2(d+ex)^2} + \frac{bn(a+b\log(cx^n))}{3de^2(d+ex)} + \frac{(a+b\log(cx^n))^2}{6d^2e^2} + \frac{d(a+b\log(cx^n))^2}{3e^2(d+ex)^3} - \frac{(a+b\log(cx^n))^2}{2e^2(d+ex)^2} - \frac{bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3d^2e^2} - \frac{b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{3d^2e^2}$$

output
```
1/3*b^2*n^2/d/e^2/(e*x+d)-1/3*b*n*(a+b*ln(c*x^n))/e^2/(e*x+d)^2+1/3*b*n*(a
+b*ln(c*x^n))/d/e^2/(e*x+d)+1/6*(a+b*ln(c*x^n))^2/d^2/e^2+1/3*d*(a+b*ln(c*
x^n))^2/e^2/(e*x+d)^3-1/2*(a+b*ln(c*x^n))^2/e^2/(e*x+d)^2-1/3*b*n*(a+b*ln(
c*x^n))*ln(1+e*x/d)/d^2/e^2-1/3*b^2*n^2*polylog(2,-e*x/d)/d^2/e^2
```

3.116.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 281, normalized size of antiderivative = 1.34

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$
$$= \frac{2b^2d^3n^2 + 2abd^2enx + 4b^2d^2en^2x + 3a^2de^2x^2 + 2abde^2nx^2 + 2b^2de^2n^2x^2 + a^2e^3x^3 + b^2e^2x^2(3d+ex)\log^2}{}$$

input
```
Integrate[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

output
```
(2*b^2*d^3*n^2 + 2*a*b*d^2*e*n*x + 4*b^2*d^2*e*n^2*x + 3*a^2*d*e^2*x^2 + 2
*a*b*d*e^2*n*x^2 + 2*b^2*d*e^2*n^2*x^2 + a^2*e^3*x^3 + b^2*e^2*x^2*(3*d +
e*x)*Log[c*x^n]^2 - 2*a*b*d^3*n*Log[1 + (e*x)/d] - 6*a*b*d^2*e*n*x*Log[1 +
 (e*x)/d] - 6*a*b*d*e^2*n*x^2*Log[1 + (e*x)/d] - 2*a*b*e^3*n*x^3*Log[1 + (
e*x)/d] - 2*b*Log[c*x^n]*(-(e*x*(b*d*n*(d + e*x) + a*e*x*(3*d + e*x))) + b
*n*(d + e*x)^3*Log[1 + (e*x)/d]) - 2*b^2*n^2*(d + e*x)^3*PolyLog[2, -((e*x
)/d)])/(6*d^2*e^2*(d + e*x)^3)
```

3.116.3 Rubi [A] (verified)

Time = 0.72 (sec) , antiderivative size = 213, normalized size of antiderivative = 1.01, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.381, Rules used = {2783, 2773, 49, 2009, 2781, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}dx$$

$$\Big\downarrow \text{2783}$$

$$-\frac{2bn\int \frac{x(a+b\log(cx^n))}{(d+ex)^3}dx}{3d}+\frac{\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}dx}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2773}$$

$$\frac{\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}dx}{3d}-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\int \frac{x}{(d+ex)^2}dx}{2d}\right)}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

$$\Big\downarrow \text{49}$$

$$\frac{\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}dx}{3d}-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\int \left(\frac{1}{e(d+ex)}-\frac{d}{e(d+ex)^2}\right)dx}{2d}\right)}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^3}dx}{3d}-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\left(\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}\right)}{2d}\right)}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2781}$$

$$\frac{\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\int\frac{x(a+b\log(cx^n))}{(d+ex)^2}dx}{d}}{3d}-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\left(\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}\right)}{2d}\right)}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\left(\frac{\int\frac{a+bn+b\log(cx^n)}{d+ex}dx}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}\right)}{d}}{3d}-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\left(\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}\right)}{2d}\right)}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2754}$$

$$\frac{\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\left(\frac{\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{e}-\frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}\right)}{d}}{3d}-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\left(\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}\right)}{2d}\right)}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2838}$$

$$-\frac{2bn\left(\frac{x^2(a+b\log(cx^n))}{2d(d+ex)^2}-\frac{bn\left(\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}\right)}{2d}\right)}{3d}+\frac{\frac{x^2(a+b\log(cx^n))^2}{2d(d+ex)^2}-\frac{bn\left(\frac{\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n)+bn)}{e}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}}{e}-\frac{x(a+b\log(cx^n))}{e(d+ex)}\right)}{d}}{3d}+\frac{x^2(a+b\log(cx^n))^2}{3d(d+ex)^3}$$

input
```
Int[(x*(a + b*Log[c*x^n])^2)/(d + e*x)^4,x]
```

3.116. $\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

output
```
(x^2*(a + b*Log[c*x^n])^2)/(3*d*(d + e*x)^3) - (2*b*n*((x^2*(a + b*Log[c*x
^n]))/(2*d*(d + e*x)^2) - (b*n*(d/(e^2*(d + e*x)) + Log[d + e*x]/e^2))/(2*
d)))/(3*d) + ((x^2*(a + b*Log[c*x^n])^2)/(2*d*(d + e*x)^2) - (b*n*(-((x*(a
 + b*Log[c*x^n]))/(e*(d + e*x))) + (((a + b*n + b*Log[c*x^n])*Log[1 + (e*x
)/d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e)/e))/d)/(3*d)
```

3.116.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2781
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + Simp[b*n*(p/(d*(q + 1)))   Int[(f*x)
^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b, c,
d, e, f, m, n, q}, x] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

3.116. $\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

rule 2783
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + (Simp[(m + q + 2)/(d*(q + 1))   Int[
(f*x)^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^p, x], x] + Simp[b*n*(p/(d*(q
+ 1)))   Int[(f*x)^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x])
/; FreeQ[{a, b, c, d, e, f, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[p, 0] && L
tQ[q, -1] && GtQ[m, 0]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.116.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.56 (sec) , antiderivative size = 508, normalized size of antiderivative = 2.42

method	result
risch	$-\frac{b^2\ln(x^n)^2}{2e^2(ex+d)^2}+\frac{b^2\ln(x^n)^2 d}{3e^2(ex+d)^3}-\frac{b^2 n\ln(x^n)}{3e^2(ex+d)^2}-\frac{b^2 n\ln(x^n)\ln(ex+d)}{3e^2d^2}+\frac{b^2 n\ln(x^n)}{3e^2d(ex+d)}+\frac{b^2 n\ln(x^n)\ln(x)}{3e^2d^2}-\frac{b^2n^2\ln(x)^2}{6e^2d^2}+$

input
```
int(x*(a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b^2*ln(x^n)^2/e^2/(e*x+d)^2+1/3*b^2*ln(x^n)^2/e^2*d/(e*x+d)^3-1/3*b^2
*n*ln(x^n)/e^2/(e*x+d)^2-1/3*b^2*n*ln(x^n)/e^2/d^2*ln(e*x+d)+1/3*b^2*n*ln(
x^n)/e^2/d/(e*x+d)+1/3*b^2*n*ln(x^n)/e^2/d^2*ln(x)-1/6*b^2*n^2/e^2/d^2*ln(
x)^2+1/3*b^2*n^2/d/e^2/(e*x+d)+1/3*b^2*n^2/e^2/d^2*ln(e*x+d)*ln(-e*x/d)+1/
3*b^2*n^2/e^2/d^2*dilog(-e*x/d)+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b
*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(-1/2*ln(x^n)/e^2/(e*x+d)^2+1/3*ln(x^
n)/e^2*d/(e*x+d)^3-1/6*n/e^2*(1/d^2*ln(e*x+d)-1/d/(e*x+d)+1/(e*x+d)^2-1/d^
2*ln(x)))+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c
)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^
3+2*b*ln(c)+2*a)^2*(-1/2/e^2/(e*x+d)^2+1/3/e^2*d/(e*x+d)^3)
```

3.116.5 Fricas [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2 x}{(ex+d)^4}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*x*log(c*x^n)^2 + 2*a*b*x*log(c*x^n) + a^2*x)/(e^4*x^4 + 4*d*
e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

3.116.6 Sympy [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

output
```
Integral(x*(a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

3.116.7 Maxima [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2 x}{(ex+d)^4}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/3*a*b*n*(x/(d*e^3*x^2 + 2*d^2*e^2*x + d^3*e) - log(e*x + d)/(d^2*e^2) +
log(x)/(d^2*e^2)) - 1/6*((3*e*x + d)*log(x^n)^2/(e^5*x^3 + 3*d*e^4*x^2 + 3
*d^2*e^3*x + d^3*e^2) - 6*integrate(1/3*(3*e^2*x^2*log(c)^2 + (4*d*e*n*x +
 d^2*n + 3*(e^2*n + 2*e^2*log(c))*x^2)*log(x^n))/(e^6*x^5 + 4*d*e^5*x^4 +
6*d^2*e^4*x^3 + 4*d^3*e^3*x^2 + d^4*e^2*x), x))*b^2 - 1/3*(3*e*x + d)*a*b*
log(c*x^n)/(e^5*x^3 + 3*d*e^4*x^2 + 3*d^2*e^3*x + d^3*e^2) - 1/6*(3*e*x +
d)*a^2/(e^5*x^3 + 3*d*e^4*x^2 + 3*d^2*e^3*x + d^3*e^2)
```

3.116.8 Giac [F]

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2 x}{(ex+d)^4}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*x/(e*x + d)^4, x)
```

3.116.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^4}\,dx$$

input
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x)^4,x)
```

output
```
int((x*(a + b*log(c*x^n))^2)/(d + e*x)^4, x)
```

3.117 $\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4} dx$

3.117.1 Optimal result

Integrand size = 20, antiderivative size = 203

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4} dx = -\frac{b^2n^2}{3d^2e(d+ex)} - \frac{b^2n^2\log(x)}{3d^3e} + \frac{bn(a+b\log(cx^n))}{3de(d+ex)^2} - \frac{2bnx(a+b\log(cx^n))}{3d^3(d+ex)} - \frac{2bn\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))}{3d^3e} - \frac{(a+b\log(cx^n))^2}{3e(d+ex)^3} + \frac{b^2n^2\log(d+ex)}{d^3e} + \frac{2b^2n^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{3d^3e}$$

output
```
-1/3*b^2*n^2/d^2/e/(e*x+d)-1/3*b^2*n^2*ln(x)/d^3/e+1/3*b*n*(a+b*ln(c*x^n))
/d/e/(e*x+d)^2-2/3*b*n*x*(a+b*ln(c*x^n))/d^3/(e*x+d)-2/3*b*n*ln(1+d/e/x)*(
a+b*ln(c*x^n))/d^3/e-1/3*(a+b*ln(c*x^n))^2/e/(e*x+d)^3+b^2*n^2*ln(e*x+d)/d
^3/e+2/3*b^2*n^2*polylog(2,-d/e/x)/d^3/e
```

3.117.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 211, normalized size of antiderivative = 1.04

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4} dx = -\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3} + \frac{2bn\left(\frac{a+b\log(cx^n)}{2d(d+ex)^2} + \frac{a+b\log(cx^n)}{d^2(d+ex)} + \frac{(a+b\log(cx^n))^2}{2bd^3n} - \frac{bn\left(\frac{1}{d(d+ex)}+\frac{\log(x)}{d^2}-\frac{\log(d+ex)}{d^2}\right)}{2d} - \frac{bn\left(\frac{\log(x)}{d}-\frac{\log(d+ex)}{d}\right)}{d^2} - \frac{(a+b\log(cx^n)}{\ldots}\right.}{3e}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(d + e*x)^4,x]
```

output
```
-1/3*(a + b*Log[c*x^n])^2/(e*(d + e*x)^3) + (2*b*n*((a + b*Log[c*x^n])/(2*
d*(d + e*x)^2) + (a + b*Log[c*x^n])/(d^2*(d + e*x)) + (a + b*Log[c*x^n])^2
/(2*b*d^3*n) - (b*n*(1/(d*(d + e*x)) + Log[x]/d^2 - Log[d + e*x]/d^2))/(2*
d) - (b*n*(Log[x]/d - Log[d + e*x]/d))/d^2 - ((a + b*Log[c*x^n])*Log[(d +
e*x)/d])/d^3 - (b*n*PolyLog[2, -((e*x)/d)])/d^3))/(3*e)
```

3.117.3 Rubi [A] (verified)

Time = 0.78 (sec) , antiderivative size = 204, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.500$, Rules used = {2756, 2789, 2756, 54, 2009, 2789, 2751, 16, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{2bn\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$$\Big\downarrow \text{2789}$$

$$\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^3}dx}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$$\Big\downarrow \text{2756}$$

$$\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^2}dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$$\Big\downarrow \text{54}$$

$$\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int\left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{1}{d^2x}\right)dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$$\Big\downarrow \text{ 2789}$$

$$\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$$\Big\downarrow \text{ 2751}$$

$$\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int\frac{1}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$$\Big\downarrow \text{ 16}$$

$$\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$$\Big\downarrow \text{ 2779}$$

3.117. $\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$

$$\frac{2bn\left(\frac{\frac{\frac{bn\int \frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right.}{3e}$$
$$\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

$\downarrow$ 2838

$$\frac{2bn\left(\frac{\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right.}{3e}$$
$$\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}$$

input
```
Int[(a + b*Log[c*x^n])^2/(d + e*x)^4,x]
```

output
```
-1/3*(a + b*Log[c*x^n])^2/(e*(d + e*x)^3) + (2*b*n*(-((e*(-1/2*(a + b*Log[
c*x^n])/(e*(d + e*x)^2) + (b*n*(1/(d*(d + e*x)) + Log[x]/d^2 - Log[d + e*x
]/d^2))/(2*e)))/d) + (-((e*((x*(a + b*Log[c*x^n]))/(d*(d + e*x)) - (b*n*Lo
g[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d) + (b*
n*PolyLog[2, -(d/(e*x))])/d)/d)/d))/(3*e)
```

3.117.3.1 Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.117.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.51 (sec) , antiderivative size = 495, normalized size of antiderivative = 2.44

method	result
risch	$-\frac{b^2\ln(x^n)^2}{3e(ex+d)^3}-\frac{2b^2n\ln(x^n)\ln(ex+d)}{3e\,d^3}+\frac{2b^2n\ln(x^n)}{3e\,d^2(ex+d)}+\frac{b^2n\ln(x^n)}{3ed(ex+d)^2}+\frac{2b^2n\ln(x^n)\ln(x)}{3e\,d^3}-\frac{b^2n^2}{3d^2e(ex+d)}+\frac{b^2n^2\ln(ex+d)}{d^3e}$

input
```
int((a+b*ln(c*x^n))^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-1/3*b^2*ln(x^n)^2/e/(e*x+d)^3-2/3*b^2/e*n*ln(x^n)/d^3*ln(e*x+d)+2/3*b^2*n
*ln(x^n)/e/d^2/(e*x+d)+1/3*b^2*n*ln(x^n)/e/d/(e*x+d)^2+2/3*b^2/e*n*ln(x^n)
/d^3*ln(x)-1/3*b^2*n^2/d^2/e/(e*x+d)+b^2*n^2*ln(e*x+d)/d^3/e-b^2*n^2*ln(x)
/d^3/e-1/3*b^2/e*n^2/d^3*ln(x)^2+2/3*b^2/e*n^2/d^3*ln(e*x+d)*ln(-e*x/d)+2/
3*b^2/e*n^2/d^3*dilog(-e*x/d)+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)
+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*P
i*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(-1/3*ln(x^n)/e/(e*x+d)^3+1/3/e*n*(-1/d
^3*ln(e*x+d)+1/d^2/(e*x+d)+1/2/d/(e*x+d)^2+1/d^3*ln(x)))-1/12*(-I*b*Pi*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2/(e*x+d)
^3/e
```

3.117.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^4*x^4 + 4*d*e^3*x^
3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4), x)
```

3.117.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/(e*x+d)**4,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(d + e*x)**4, x)
```

3.117.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/3*a*b*n*((2*e*x + 3*d)/(d^2*e^3*x^2 + 2*d^3*e^2*x + d^4*e) - 2*log(e*x +
 d)/(d^3*e) + 2*log(x)/(d^3*e)) - 1/3*b^2*(log(x^n)^2/(e^4*x^3 + 3*d*e^3*x
^2 + 3*d^2*e^2*x + d^3*e) - 3*integrate(1/3*(3*e*x*log(c)^2 + 2*(d*n + (e*
n + 3*e*log(c))*x)*log(x^n))/(e^5*x^5 + 4*d*e^4*x^4 + 6*d^2*e^3*x^3 + 4*d^
3*e^2*x^2 + d^4*e*x), x)) - 2/3*a*b*log(c*x^n)/(e^4*x^3 + 3*d*e^3*x^2 + 3*
d^2*e^2*x + d^3*e) - 1/3*a^2/(e^4*x^3 + 3*d*e^3*x^2 + 3*d^2*e^2*x + d^3*e)
```

3.117.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/(e*x + d)^4, x)
```

3.117.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{(d+e\,x)^4}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(d + e*x)^4,x)
```

output
```
int((a + b*log(c*x^n))^2/(d + e*x)^4, x)
```

3.118 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx$

3.118.1 Optimal result

Integrand size = 23, antiderivative size = 351

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx = \frac{b^2n^2}{3d^3(d+ex)}+\frac{b^2n^2\log(x)}{3d^4}-\frac{bn(a+b\log(cx^n))}{3d^2(d+ex)^2} +\frac{5benx(a+b\log(cx^n))}{3d^4(d+ex)}-\frac{5(a+b\log(cx^n))^2}{6d^4}+\frac{(a+b\log(cx^n))^2}{3d(d+ex)^3} +\frac{(a+b\log(cx^n))^2}{2d^2(d+ex)^2}-\frac{ex(a+b\log(cx^n))^2}{d^4(d+ex)}+\frac{(a+b\log(cx^n))^3}{3bd^4n} -\frac{2b^2n^2\log(d+ex)}{d^4}+\frac{11bn(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3d^4} -\frac{(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^4}+\frac{11b^2n^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{3d^4} -\frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^4}+\frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^4}$$

output
```
1/3*b^2*n^2/d^3/(e*x+d)+1/3*b^2*n^2*ln(x)/d^4-1/3*b*n*(a+b*ln(c*x^n))/d^2/
(e*x+d)^2+5/3*b*e*n*x*(a+b*ln(c*x^n))/d^4/(e*x+d)-5/6*(a+b*ln(c*x^n))^2/d^
4+1/3*(a+b*ln(c*x^n))^2/d/(e*x+d)^3+1/2*(a+b*ln(c*x^n))^2/d^2/(e*x+d)^2-e*
x*(a+b*ln(c*x^n))^2/d^4/(e*x+d)+1/3*(a+b*ln(c*x^n))^3/b/d^4/n-2*b^2*n^2*ln
(e*x+d)/d^4+11/3*b*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^4-(a+b*ln(c*x^n))^2*ln(
1+e*x/d)/d^4+11/3*b^2*n^2*polylog(2,-e*x/d)/d^4-2*b*n*(a+b*ln(c*x^n))*poly
log(2,-e*x/d)/d^4+2*b^2*n^2*polylog(3,-e*x/d)/d^4
```

3.118.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 318, normalized size of antiderivative = 0.91

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx$$
$$= \frac{-\frac{2bd^2n(a+b\log(cx^n))}{(d+ex)^2} - \frac{10bdn(a+b\log(cx^n))}{d+ex} - 11(a+b\log(cx^n))^2 + \frac{2d^3(a+b\log(cx^n))^2}{(d+ex)^3} + \frac{3d^2(a+b\log(cx^n))^2}{(d+ex)^2} + \frac{6d(a+b\log}{d+e}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x)^4),x]
```

output
```
((-2*b*d^2*n*(a + b*Log[c*x^n]))/(d + e*x)^2 - (10*b*d*n*(a + b*Log[c*x^n]
))/(d + e*x) - 11*(a + b*Log[c*x^n])^2 + (2*d^3*(a + b*Log[c*x^n])^2)/(d +
 e*x)^3 + (3*d^2*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (6*d*(a + b*Log[c*x^n
])^2)/(d + e*x) + (2*(a + b*Log[c*x^n])^3)/(b*n) + 10*b^2*n^2*(Log[x] - Lo
g[d + e*x]) + (2*b^2*n^2*(d + (d + e*x)*Log[x] - (d + e*x)*Log[d + e*x]))/
(d + e*x) + 22*b*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - 6*(a + b*Log[c*x^
n])^2*Log[1 + (e*x)/d] + 22*b^2*n^2*PolyLog[2, -((e*x)/d)] - 12*b*n*(a + b
*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 12*b^2*n^2*PolyLog[3, -((e*x)/d)])/(
6*d^4)
```

3.118.3 Rubi [A] (verified)

Time = 2.79 (sec) , antiderivative size = 508, normalized size of antiderivative = 1.45, number of steps used = 15, number of rules used = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.652$, Rules used = {2789, 2756, 2789, 2756, 54, 2009, 2789, 2751, 16, 2755, 2754, 2779, 2821, 2838, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx$$
$$\Big\downarrow \text{ 2789}$$
$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^4}dx}{d}$$
$$\Big\downarrow \text{ 2756}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^3}dx}{d}-\frac{e\left(\frac{2bn\int \frac{a+b\log(cx^n)}{x(d+ex)^3}dx}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$\Big\downarrow$ 2789

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^3}dx}{d}}{d}-\frac{e\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^3}dx}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$\Big\downarrow$ 2756

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(d+ex)^2}dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$\Big\downarrow$ 54

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{bn\int \left(-\frac{e}{d^2(d+ex)}-\frac{e}{d(d+ex)^2}+\frac{1}{d^2x}\right)dx}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$\Big\downarrow$ 2009

3.118. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{d} - \frac{e\left(\frac{bn\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{e} - \frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}}{d} - \frac{e\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)^2}dx}{d} - \frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e} - \frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e} - \frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$\downarrow$ 2789

$$\frac{\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d} - \frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}}{d} - \frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d} - \frac{e\int\frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}\right)}{e} - \frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}}{d} - \frac{e\left(\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d} - \frac{e\int\frac{a+b\log(cx^n)}{(d+ex)^2}dx}{d}}{d} - \frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e} - \frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e} - \frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$\downarrow$ 2751

3.118. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx$

$$\frac{\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\int \frac{1}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \; 16$$

$$\frac{\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n))^2}{2e(d+ex)^2}\right)}{d}}{d}-\frac{e\left(\frac{2bn\left(\frac{\frac{\int \frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \; 2755$$

3.118. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx$

$$\frac{\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\int\frac{a+b\log(cx^n)}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int\frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}\right)}{e}-\frac{(a+b\log(cx^n}{2e(d+ex)^2}\right)}{d}}{d}$$

$$\frac{e\left(\frac{2bn\left(\frac{\frac{\int\frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \; 2754$$

$$\frac{\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int\frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\right.}{d}\right.}{e}\right.}{d}}{d}$$

$$\frac{e\left(\frac{2bn\left(\frac{\frac{\int\frac{a+b\log(cx^n)}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right)}{3e}-\frac{(a+b\log(cx^n))^2}{3e(d+ex)^3}\right)}{d}$$

$$\Big\downarrow \; 2779$$

3.118. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx$

$$\frac{\frac{\frac{\frac{2bn\int \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}}{d}-\frac{e\Bigg(\cdots}{d}\cdots$$

$$\frac{e\left(\frac{2bn\left(\frac{\frac{\frac{bn\int\frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\cdots\right)}{3e}\cdots\right)}{d}$$

$\downarrow$ 2821

$$\frac{\frac{\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-bn\cdots\right)}{d}\cdots\right)}{d}}{d}\cdots$$

$$\frac{e\left(\frac{2bn\left(\frac{\frac{\frac{bn\int\frac{\log\left(\frac{d}{ex}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\cdots\right)}{3e}\cdots\right)}{d}$$

$\downarrow$ 2838

3.118. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx$

$$\frac{\frac{\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx}{d}\right)-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\frac{bn}{\cdots}\right.}{d}\right.}{d}}{d}}{d}$$

$$\frac{e\left(\frac{2bn\left(\frac{\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right.}{3e}\right.}{d}$$

$\Big\downarrow$ 7143

$$\frac{\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}+\frac{bn\,\text{PolyL}\cdots}{\cdots}\right.}{d}\right.}{d}}{d}$$

$$\frac{e\left(\frac{2bn\left(\frac{\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))}{d(d+ex)}-\frac{bn\log(d+ex)}{de}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex)}{d^2}+\frac{\log(x)}{d^2}+\frac{1}{d(d+ex)}\right)}{2e}-\frac{a+b\log(cx^n)}{2e(d+ex)^2}\right)}{d}\right.}{3e}\right.}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x)^4),x]
```

3.118. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx$

output
```
-((e*(-1/3*(a + b*Log[c*x^n])^2/(e*(d + e*x)^3) + (2*b*n*(-((e*(-1/2*(a +
b*Log[c*x^n])/(e*(d + e*x)^2) + (b*n*(1/(d*(d + e*x)) + Log[x]/d^2 - Log[d
 + e*x]/d^2))/(2*e)))/d) + (-((e*((x*(a + b*Log[c*x^n]))/(d*(d + e*x)) - (
b*n*Log[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/d)
 + (b*n*PolyLog[2, -(d/(e*x))])/d)/d)/d))/(3*e)))/d) + (-((e*(-1/2*(a + b*
Log[c*x^n])^2/(e*(d + e*x)^2) + (b*n*(-((e*((x*(a + b*Log[c*x^n]))/(d*(d +
 e*x)) - (b*n*Log[d + e*x])/(d*e)))/d) + (-((Log[1 + d/(e*x)]*(a + b*Log[c
*x^n]))/d) + (b*n*PolyLog[2, -(d/(e*x))])/d)/d))/e))/d) + (-((e*((x*(a + b
*Log[c*x^n])^2)/(d*(d + e*x)) - (2*b*n*(((a + b*Log[c*x^n])*Log[1 + (e*x)/
d])/e + (b*n*PolyLog[2, -((e*x)/d)])/e))/d))/d) + (-((Log[1 + d/(e*x)]*(a
+ b*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))]
+ b*n*PolyLog[3, -(d/(e*x))]))/d)/d)/d)/d
```

3.118.3.1 Defintions of rubi rules used

rule 16
```
Int[(c_.)/((a_.) + (b_.)*(x_)), x_Symbol] :> Simp[c*(Log[RemoveContent[a +
b*x, x]]/b), x] /; FreeQ[{a, b, c}, x]
```

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

3.118. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx$

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.118. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx$

3.118.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.68 (sec) , antiderivative size = 894, normalized size of antiderivative = 2.55

method	result	size
risch	Expression too large to display	894

input
```
int((a+b*ln(c*x^n))^2/x/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c
*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c
)+2*a)^2*(-1/d^4*ln(e*x+d)+1/d^3/(e*x+d)+1/2/d^2/(e*x+d)^2+1/3/d/(e*x+d)^3
+1/d^4*ln(x))-11/3*b^2/d^4*n^2*ln(e*x+d)*ln(-e*x/d)-b^2*n/d^4*ln(x^n)*ln(x
)^2-2*b^2/d^4*ln(x)*dilog(-e*x/d)*n^2+2*b^2*n/d^4*ln(x^n)*dilog(-e*x/d)+b^
2/d^4*n^2*ln(e*x+d)*ln(x)^2-b^2/d^4*n^2*ln(x)^2*ln(1+e*x/d)-2*b^2/d^4*n^2*
ln(x)*polylog(2,-e*x/d)+11/3*b^2*n*ln(x^n)/d^4*ln(e*x+d)-11/3*b^2*n*ln(x^n
)/d^4*ln(x)+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*
csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+
2*b*ln(c)+2*a)*b*(-ln(x^n)/d^4*ln(e*x+d)+ln(x^n)/d^3/(e*x+d)+1/2*ln(x^n)/d
^2/(e*x+d)^2+1/3*ln(x^n)/d/(e*x+d)^3+ln(x^n)/d^4*ln(x)-1/6*n*(5/d^3/(e*x+d
)+1/d^2/(e*x+d)^2-11/d^4*ln(e*x+d)+11/d^4*ln(x)+3/d^4*ln(x)^2-6/d^4*ln(e*x
+d)*ln(-e*x/d)-6/d^4*dilog(-e*x/d)))+2*b^2*n/d^4*ln(x^n)*ln(e*x+d)*ln(-e*x
/d)-2*b^2/d^4*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-5/3*b^2*n*ln(x^n)/d^3/(e*x+d)
-1/3*b^2*n*ln(x^n)/d^2/(e*x+d)^2-b^2*ln(x^n)^2/d^4*ln(e*x+d)+b^2*ln(x^n)^2
/d^3/(e*x+d)+1/2*b^2*ln(x^n)^2/d^2/(e*x+d)^2+1/3*b^2*ln(x^n)^2/d/(e*x+d)^3
+b^2*ln(x^n)^2/d^4*ln(x)+11/6*b^2/d^4*n^2*ln(x)^2-11/3*b^2/d^4*n^2*dilog(-
e*x/d)+1/3*b^2/d^4*ln(x)^3*n^2+1/3*b^2*n^2/d^3/(e*x+d)+2*b^2*n^2*ln(x)/d^4
-2*b^2*n^2*ln(e*x+d)/d^4+2*b^2*n^2*polylog(3,-e*x/d)/d^4
```

3.118.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx=\int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^4*x^5 + 4*d*e^3*x^
4 + 6*d^2*e^2*x^3 + 4*d^3*e*x^2 + d^4*x), x)
```

3.118.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx = \int \frac{(a+b\log(cx^n))^2}{x\,(d+ex)^4}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(e*x+d)**4,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x*(d + e*x)**4), x)
```

3.118.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^4,x, algorithm="maxima")
```

output
```
1/6*a^2*((6*e^2*x^2 + 15*d*e*x + 11*d^2)/(d^3*e^3*x^3 + 3*d^4*e^2*x^2 + 3*
d^5*e*x + d^6) - 6*log(e*x + d)/d^4 + 6*log(x)/d^4) + integrate((b^2*log(c
)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e^4*
x^5 + 4*d*e^3*x^4 + 6*d^2*e^2*x^3 + 4*d^3*e*x^2 + d^4*x), x)
```

3.118.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^4*x), x)
```

3.118.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^4}\,dx=\int \frac{\left(a+b\,\ln\left(c\,x^n\right)\right)^2}{x\,\left(d+e\,x\right)^4}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)^4),x)
```

output
```
int((a + b*log(c*x^n))^2/(x*(d + e*x)^4), x)
```

3.119 $\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx$

3.119.1 Optimal result

Integrand size = 23, antiderivative size = 420

$$
\begin{aligned}
\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = & -\frac{2b^2n^2}{d^4x}-\frac{b^2en^2}{3d^4(d+ex)}-\frac{b^2en^2\log(x)}{3d^5}-\frac{2bn(a+b\log(cx^n))}{d^4x} \\
& +\frac{ben(a+b\log(cx^n))}{3d^3(d+ex)^2}-\frac{8be^2nx(a+b\log(cx^n))}{3d^5(d+ex)} \\
& +\frac{4e(a+b\log(cx^n))^2}{3d^5}-\frac{(a+b\log(cx^n))^2}{d^4x} \\
& -\frac{e(a+b\log(cx^n))^2}{3d^2(d+ex)^3}-\frac{e(a+b\log(cx^n))^2}{d^3(d+ex)^2} \\
& +\frac{3e^2x(a+b\log(cx^n))^2}{d^5(d+ex)}-\frac{4e(a+b\log(cx^n))^3}{3bd^5n} \\
& +\frac{3b^2en^2\log(d+ex)}{d^5}-\frac{26ben(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{3d^5} \\
& +\frac{4e(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^5}-\frac{26b^2en^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{3d^5} \\
& +\frac{8ben(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^5} \\
& -\frac{8b^2en^2\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^5}
\end{aligned}
$$

output
```
-2*b^2*n^2/d^4/x-1/3*b^2*e*n^2/d^4/(e*x+d)-1/3*b^2*e*n^2*ln(x)/d^5-2*b*n*(
a+b*ln(c*x^n))/d^4/x+1/3*b*e*n*(a+b*ln(c*x^n))/d^3/(e*x+d)^2-8/3*b*e^2*n*x
*(a+b*ln(c*x^n))/d^5/(e*x+d)+4/3*e*(a+b*ln(c*x^n))^2/d^5-(a+b*ln(c*x^n))^2
/d^4/x-1/3*e*(a+b*ln(c*x^n))^2/d^2/(e*x+d)^3-e*(a+b*ln(c*x^n))^2/d^3/(e*x+
d)^2+3*e^2*x*(a+b*ln(c*x^n))^2/d^5/(e*x+d)-4/3*e*(a+b*ln(c*x^n))^3/b/d^5/n
+3*b^2*e*n^2*ln(e*x+d)/d^5-26/3*b*e*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^5+4*e*
(a+b*ln(c*x^n))^2*ln(1+e*x/d)/d^5-26/3*b^2*e*n^2*polylog(2,-e*x/d)/d^5+8*b
*e*n*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^5-8*b^2*e*n^2*polylog(3,-e*x/d)/d
^5
```

3.119.2 Mathematica [A] (verified)

Time = 0.45 (sec) , antiderivative size = 378, normalized size of antiderivative = 0.90

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx =$$

$$-\frac{\frac{6b^2dn^2}{x}+\frac{6bdn(a+b\log(cx^n))}{x}-\frac{bd^2en(a+b\log(cx^n))}{(d+ex)^2}-\frac{8bden(a+b\log(cx^n))}{d+ex}-13e(a+b\log(cx^n))^2+\frac{3d(a+b\log(cx^n))^2}{x}+\cdots}{\cdots}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^4),x]
```

output
```
-1/3*((6*b^2*d*n^2)/x + (6*b*d*n*(a + b*Log[c*x^n]))/x - (b*d^2*e*n*(a + b
*Log[c*x^n]))/(d + e*x)^2 - (8*b*d*e*n*(a + b*Log[c*x^n]))/(d + e*x) - 13*
e*(a + b*Log[c*x^n])^2 + (3*d*(a + b*Log[c*x^n])^2)/x + (d^3*e*(a + b*Log[
c*x^n])^2)/(d + e*x)^3 + (3*d^2*e*(a + b*Log[c*x^n])^2)/(d + e*x)^2 + (9*d
*e*(a + b*Log[c*x^n])^2)/(d + e*x) + (4*e*(a + b*Log[c*x^n])^3)/(b*n) + 8*
b^2*e*n^2*(Log[x] - Log[d + e*x]) + (b^2*e*n^2*(d + (d + e*x)*Log[x] - (d
+ e*x)*Log[d + e*x]))/(d + e*x) + 26*b*e*n*(a + b*Log[c*x^n])*Log[1 + (e*x
)/d] - 12*e*(a + b*Log[c*x^n])^2*Log[1 + (e*x)/d] + 26*b^2*e*n^2*PolyLog[2
, -((e*x)/d)] - 24*b*e*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 24*b^
2*e*n^2*PolyLog[3, -((e*x)/d)])/d^5
```

3.119.3 Rubi [A] (verified)

Time = 1.06 (sec) , antiderivative size = 432, normalized size of antiderivative = 1.03, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx$$

$$\Big\downarrow \; 2795$$

$$\int \left(\frac{3e^2(a+b\log(cx^n))^2}{d^4(d+ex)^2}-\frac{4e(a+b\log(cx^n))^2}{d^4x(d+ex)}+\frac{(a+b\log(cx^n))^2}{d^4x^2}+\frac{2e^2(a+b\log(cx^n))^2}{d^3(d+ex)^3}+\frac{e^2(a+b\log(cx^n)}{d^2(d+ex)^4}\right.$$

$$\Big\downarrow \; 2009$$

$$\frac{3e^2x(a+b\log(cx^n))^2}{d^5(d+ex)}-\frac{8be^2nx(a+b\log(cx^n))}{3d^5(d+ex)}-\frac{8ben\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))}{d^5}+\frac{4e\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d^5}-\frac{8ben\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{3d^5}-\frac{6ben\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{d^5}-\frac{(a+b\log(cx^n))^2}{d^4x}-\frac{2bn(a+b\log(cx^n))}{d^4x}-\frac{e(a+b\log(cx^n))^2}{d^3(d+ex)^2}+\frac{ben(a+b\log(cx^n))}{3d^3(d+ex)^2}-\frac{e(a+b\log(cx^n))^2}{3d^2(d+ex)^3}+\frac{8b^2en^2\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{3d^5}-\frac{6b^2en^2\,\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^5}-\frac{8b^2en^2\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^5}-\frac{b^2en^2\log(x)}{3d^5}+\frac{3b^2en^2\log(d+ex)}{d^5}-\frac{b^2en^2}{3d^4(d+ex)}-\frac{2b^2n^2}{d^4x}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x^2*(d + e*x)^4),x]
```

output
```
(-2*b^2*n^2)/(d^4*x) - (b^2*e*n^2)/(3*d^4*(d + e*x)) - (b^2*e*n^2*Log[x])/
(3*d^5) - (2*b*n*(a + b*Log[c*x^n]))/(d^4*x) + (b*e*n*(a + b*Log[c*x^n]))/
(3*d^3*(d + e*x)^2) - (8*b*e^2*n*x*(a + b*Log[c*x^n]))/(3*d^5*(d + e*x)) -
 (8*b*e*n*Log[1 + d/(e*x)]*(a + b*Log[c*x^n]))/(3*d^5) - (a + b*Log[c*x^n]
)^2/(d^4*x) - (e*(a + b*Log[c*x^n])^2)/(3*d^2*(d + e*x)^3) - (e*(a + b*Log
[c*x^n])^2)/(d^3*(d + e*x)^2) + (3*e^2*x*(a + b*Log[c*x^n])^2)/(d^5*(d + e
*x)) + (4*e*Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^2)/d^5 + (3*b^2*e*n^2*Log[
d + e*x])/d^5 - (6*b*e*n*(a + b*Log[c*x^n])*Log[1 + (e*x)/d])/d^5 + (8*b^2
*e*n^2*PolyLog[2, -(d/(e*x))])/(3*d^5) - (8*b*e*n*(a + b*Log[c*x^n])*PolyL
og[2, -(d/(e*x))])/d^5 - (6*b^2*e*n^2*PolyLog[2, -((e*x)/d)])/d^5 - (8*b^2
*e*n^2*PolyLog[3, -(d/(e*x))])/d^5
```

3.119.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.119.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.66 (sec) , antiderivative size = 1015, normalized size of antiderivative = 2.42

method	result	size
risch	Expression too large to display	1015

input
```
int((a+b*ln(c*x^n))^2/x^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-2*b^2*n*ln(x^n)/d^4/x-3*b^2*ln(x^n)^2/d^4*e/(e*x+d)-b^2*ln(x^n)^2/d^3/(e*
x+d)^2*e-1/3*b^2*ln(x^n)^2/d^2/(e*x+d)^3*e+1/4*(-I*b*Pi*csgn(I*c)*csgn(I*x
^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn
(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(-1/3/d^2/(e*x+d)^3*e+
4/d^5*e*ln(e*x+d)-3/d^4*e/(e*x+d)-1/d^3/(e*x+d)^2*e-1/d^4/x-4/d^5*e*ln(x))
+4*b^2*ln(x^n)^2/d^5*e*ln(e*x+d)-26/3*b^2*n*ln(x^n)/d^5*e*ln(e*x+d)+26/3*b
^2*n*ln(x^n)/d^5*e*ln(x)+26/3*b^2/d^5*n^2*e*ln(e*x+d)*ln(-e*x/d)+4*b^2*n/d
^5*e*ln(x^n)*ln(x)^2+8*b^2/d^5*e*ln(x)*dilog(-e*x/d)*n^2-8*b^2*n/d^5*e*ln(
x^n)*dilog(-e*x/d)-4*b^2/d^5*e*n^2*ln(e*x+d)*ln(x)^2+4*b^2/d^5*e*n^2*ln(x)
^2*ln(1+e*x/d)+8*b^2/d^5*e*n^2*ln(x)*polylog(2,-e*x/d)-4*b^2*ln(x^n)^2/d^5
*e*ln(x)-13/3*b^2/d^5*n^2*e*ln(x)^2+26/3*b^2/d^5*n^2*e*dilog(-e*x/d)-4/3*b
^2/d^5*e*ln(x)^3*n^2+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*c
sgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*
c*x^n)^3+2*b*ln(c)+2*a)*b*(-1/3*ln(x^n)/d^2/(e*x+d)^3*e+4*ln(x^n)/d^5*e*ln
(e*x+d)-3*ln(x^n)/d^4*e/(e*x+d)-ln(x^n)/d^3/(e*x+d)^2*e-ln(x^n)/d^4/x-4*ln
(x^n)/d^5*e*ln(x)-1/3*n*(-6/d^5*e*ln(x)^2+12/d^5*e*(dilog(-e*x/d)+ln(e*x+d
)*ln(-e*x/d))-4/d^4*e/(e*x+d)+13/d^5*e*ln(e*x+d)-1/2/d^3/(e*x+d)^2*e+3/d^4
/x-13/d^5*e*ln(x)))+8/3*b^2*n*ln(x^n)/d^4*e/(e*x+d)+1/3*b^2*n*ln(x^n)/d^3/
(e*x+d)^2*e+8*b^2/d^5*e*ln(x)*ln(e*x+d)*ln(-e*x/d)*n^2-8*b^2*n/d^5*e*ln(x^
n)*ln(e*x+d)*ln(-e*x/d)-1/3*b^2*e*n^2/d^4/(e*x+d)-3*b^2*e*n^2*ln(x)/d^5...
```

3.119.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^4*x^6 + 4*d*e^3*x^
5 + 6*d^2*e^2*x^4 + 4*d^3*e*x^3 + d^4*x^2), x)
```

3.119.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = \int \frac{(a+b\log(cx^n))^2}{x^2\,(d+ex)^4}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x**2/(e*x+d)**4,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x**2*(d + e*x)**4), x)
```

3.119.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/3*a^2*((12*e^3*x^3 + 30*d*e^2*x^2 + 22*d^2*e*x + 3*d^3)/(d^4*e^3*x^4 +
3*d^5*e^2*x^3 + 3*d^6*e*x^2 + d^7*x) - 12*e*log(e*x + d)/d^5 + 12*e*log(x)
/d^5) + integrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*l
og(c) + a*b)*log(x^n))/(e^4*x^6 + 4*d*e^3*x^5 + 6*d^2*e^2*x^4 + 4*d^3*e*x^
3 + d^4*x^2), x)
```

3.119.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex+d)^4x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x + d)^4*x^2), x)
```

3.119.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x^2(d+ex)^4}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x^2\,(d+e\,x)^4}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^4),x)
```

output
```
int((a + b*log(c*x^n))^2/(x^2*(d + e*x)^4), x)
```

3.120 $\int \frac{x\log^2(x)}{(d+ex)^4}\,dx$

3.120.1 Optimal result

Integrand size = 13, antiderivative size = 107

$$\int \frac{x\log^2(x)}{(d+ex)^4}\,dx = -\frac{x}{3d^2e(d+ex)}+\frac{x\log(x)}{3de(d+ex)^2}+\frac{x^2(3d+ex)\log^2(x)}{6d^2(d+ex)^3} -\frac{\log(x)\log\left(1+\frac{ex}{d}\right)}{3d^2e^2}-\frac{\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{3d^2e^2}$$

output
```
-1/3*x/d^2/e/(e*x+d)+1/3*x*ln(x)/d/e/(e*x+d)^2+1/6*x^2*(e*x+3*d)*ln(x)^2/d
^2/(e*x+d)^3-1/3*ln(x)*ln(1+e*x/d)/d^2/e^2-1/3*polylog(2,-e*x/d)/d^2/e^2
```

3.120.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 96, normalized size of antiderivative = 0.90

$$\int \frac{x\log^2(x)}{(d+ex)^4}\,dx = \frac{2d(d+ex)^2+e^2x^2(3d+ex)\log^2(x)-2(d+ex)\log(x)\left(-dex+(d+ex)^2\log\left(1+\frac{ex}{d}\right)\right)-2(d+ex)^3\,\text{Po}}{6d^2e^2(d+ex)^3}$$

input
```
Integrate[(x*Log[x]^2)/(d + e*x)^4,x]
```

output
```
(2*d*(d + e*x)^2 + e^2*x^2*(3*d + e*x)*Log[x]^2 - 2*(d + e*x)*Log[x]*(-(d*
e*x) + (d + e*x)^2*Log[1 + (e*x)/d]) - 2*(d + e*x)^3*PolyLog[2, -((e*x)/d)
])/(6*d^2*e^2*(d + e*x)^3)
```

3.120.3 Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 164, normalized size of antiderivative = 1.53, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.615, Rules used = {2783, 2773, 49, 2009, 2781, 2784, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x\log^2(x)}{(d+ex)^4}dx$$

$$\Big\downarrow \text{2783}$$

$$\frac{\int \frac{x\log^2(x)}{(d+ex)^3}dx}{3d}-\frac{2\int \frac{x\log(x)}{(d+ex)^3}dx}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2773}$$

$$-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\int \frac{x}{(d+ex)^2}dx}{2d}\right)}{3d}+\frac{\int \frac{x\log^2(x)}{(d+ex)^3}dx}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$$\Big\downarrow \text{49}$$

$$-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\int \left(\frac{1}{e(d+ex)}-\frac{d}{e(d+ex)^2}\right)dx}{2d}\right)}{3d}+\frac{\int \frac{x\log^2(x)}{(d+ex)^3}dx}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\int \frac{x\log^2(x)}{(d+ex)^3}dx}{3d}-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}}{2d}\right)}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2781}$$

$$\frac{\frac{x^2\log^2(x)}{2d(d+ex)^2}-\frac{\int \frac{x\log(x)}{(d+ex)^2}dx}{d}}{3d}-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}}{2d}\right)}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2784}$$

$$\frac{\frac{x^2\log^2(x)}{2d(d+ex)^2}-\frac{\frac{\int \frac{\log(x)+1}{d+ex}dx}{e}-\frac{x\log(x)}{e(d+ex)}}{d}}{3d}-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}}{2d}\right)}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2754}$$

$$\frac{\frac{x^2\log^2(x)}{2d(d+ex)^2}-\frac{\frac{\frac{(\log(x)+1)\log\left(\frac{ex}{d}+1\right)}{e}-\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}}{e}-\frac{x\log(x)}{e(d+ex)}}{d}}{3d}-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}}{2d}\right)}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

$$\Big\downarrow \text{2838}$$

$$-\frac{2\left(\frac{x^2\log(x)}{2d(d+ex)^2}-\frac{\frac{d}{e^2(d+ex)}+\frac{\log(d+ex)}{e^2}}{2d}\right)}{3d}+\frac{\frac{x^2\log^2(x)}{2d(d+ex)^2}-\frac{\frac{\frac{\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{e}+\frac{(\log(x)+1)\log\left(\frac{ex}{d}+1\right)}{e}}{e}-\frac{x\log(x)}{e(d+ex)}}{d}}{3d}+\frac{x^2\log^2(x)}{3d(d+ex)^3}$$

input
```
Int[(x*Log[x]^2)/(d + e*x)^4,x]
```

output
```
(x^2*Log[x]^2)/(3*d*(d + e*x)^3) - (2*((x^2*Log[x])/(2*d*(d + e*x)^2) - (d
/(e^2*(d + e*x)) + Log[d + e*x]/e^2)/(2*d)))/(3*d) + ((x^2*Log[x]^2)/(2*d*
(d + e*x)^2) - (-((x*Log[x])/(e*(d + e*x))) + (((1 + Log[x])*Log[1 + (e*x)
/d])/e + PolyLog[2, -((e*x)/d)]/e)/e)/d)/(3*d)
```

3.120.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2781
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + Simp[b*n*(p/(d*(q + 1)))   Int[(f*x)
^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b, c,
d, e, f, m, n, q}, x] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

rule 2783
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_))^(q_), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x)^(q + 1)*((a
+ b*Log[c*x^n])^p/(d*f*(q + 1))), x] + (Simp[(m + q + 2)/(d*(q + 1))   Int[
(f*x)^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^p, x], x] + Simp[b*n*(p/(d*(q
+ 1)))   Int[(f*x)^m*(d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p - 1), x], x])
/; FreeQ[{a, b, c, d, e, f, n}, x] && ILtQ[m + q + 2, 0] && IGtQ[p, 0] && L
tQ[q, -1] && GtQ[m, 0]
```

rule 2784
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_))^(q_.), x_Symbol] :> Simp[(f*x)^m*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)/(e*(q + 1))), x] - Simp[f/(e*(q + 1))   Int[(f*x)^(m - 1)*(d + e*x)^(q +
1)*(a*m + b*n + b*m*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d, e, f, m, n},
x] && ILtQ[q, -1] && GtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.120.4 Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 180, normalized size of antiderivative = 1.68

method	result
parts	$-\frac{\ln(x)^2}{2e^2(ex+d)^2}+\frac{\ln(x)^2 d}{3e^2(ex+d)^3}+\frac{\ln(x)^2}{6d^2e^2}-\frac{\frac{\operatorname{dilog}\left(\frac{ex+d}{d}\right)}{e}+\frac{\ln(x)\ln\left(\frac{ex+d}{d}\right)}{e}}{3e\,d^2}+\frac{-\frac{\ln(ex+d)}{3d^2e}+\frac{1}{3de(ex+d)}+\frac{\ln(x)x(ex+2d)}{3d^2(ex+d)^2}}{e}-\frac{-\frac{\ln(ex+}{de}}{}$

input
```
int(x*ln(x)^2/(e*x+d)^4,x,method=_RETURNVERBOSE)
```

output
```
-1/2*ln(x)^2/e^2/(e*x+d)^2+1/3*ln(x)^2/e^2*d/(e*x+d)^3+1/6/d^2/e^2*ln(x)^2
-1/3/e/d^2*(dilog((e*x+d)/d)/e+ln(x)*ln((e*x+d)/d)/e)+2/3/e*(-1/2/d^2*ln(e
*x+d)/e+1/2/d/e/(e*x+d)+1/2*ln(x)*x*(e*x+2*d)/d^2/(e*x+d)^2)-1/3/e/d*(-1/d
/e*ln(e*x+d)+ln(x)*x/d/(e*x+d))
```

3.120.5 Fricas [F]

$$\int \frac{x \log^2(x)}{(d+ex)^4}\,dx = \int \frac{x \log(x)^2}{(ex+d)^4}\,dx$$

input
```
integrate(x*log(x)^2/(e*x+d)^4,x, algorithm="fricas")
```

output
```
integral(x*log(x)^2/(e^4*x^4 + 4*d*e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d
^4), x)
```

3.120.6 Sympy [A] (verification not implemented)

Time = 20.97 (sec) , antiderivative size = 374, normalized size of antiderivative = 3.50

$$
\begin{aligned}
\int \frac{x\log^2(x)}{(d+ex)^4}\,dx &= \frac{(-d-3ex)\log(x)^2}{6d^3e^2+18d^2e^3x+18de^4x^2+6e^5x^3} \\
&+ \frac{\left(\begin{cases} \frac{x}{d^3} & \text{for } e=0 \\ -\frac{1}{2e(d+ex)^2} & \text{otherwise} \end{cases}\right)\log(x)}{e} - \frac{\begin{cases} \frac{x}{d^3} & \text{for } e=0 \\ -\frac{1}{2d^2e+2de^2x} - \frac{\log(x)}{2d^2e} + \frac{\log\left(\frac{d}{e}+x\right)}{2d^2e} & \text{otherwise} \end{cases}}{e} \\
&+ \frac{\begin{cases} -\frac{1}{e^3x} & \text{for } d=0 \\ -\frac{1}{2de^2+2e^3x} - \frac{\log(d+ex)}{2de^2} & \text{otherwise} \end{cases}}{3d} - \frac{\left(\begin{cases} \frac{1}{e^3x} & \text{for } d=0 \\ -\frac{1}{2d\left(\frac{d}{x}+e\right)^2} & \text{otherwise} \end{cases}\right)\log(x)}{3d} \\
&- \frac{2\left(\begin{cases} -\frac{1}{e^2x} & \text{for } d=0 \\ -\frac{\log(d^2+dex)}{de} & \text{otherwise} \end{cases}\right)}{3de} + \frac{2\left(\begin{cases} \frac{1}{e^2x} & \text{for } d=0 \\ -\frac{1}{\frac{d^2}{x}+de} & \text{otherwise} \end{cases}\right)\log(x)}{3de} \\
&+ \frac{\begin{cases} -\frac{1}{ex} & \text{for } d \\ \frac{\begin{cases} \operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ \log(e)\log(x)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } |x|<1 \\ -\log(e)\log\left(\frac{1}{x}\right)+\operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle|\, x\right)\log(e) + G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle|\, x\right)\log(e) + \operatorname{Li}_2\left(\frac{de^{i\pi}}{ex}\right) & \text{otherwise} \end{cases}}{d} & \text{othe} \end{cases}}{3de^2} \\
&- \frac{\left(\begin{cases} \frac{1}{ex} & \text{for } d=0 \\ \frac{\log\left(\frac{d}{x}+e\right)}{d} & \text{otherwise} \end{cases}\right)\log(x)}{3de^2}
\end{aligned}
$$

input

```
integrate(x*ln(x)**2/(e*x+d)**4,x)
```

output
```
(-d - 3*e*x)*log(x)**2/(6*d**3*e**2 + 18*d**2*e**3*x + 18*d*e**4*x**2 + 6*
e**5*x**3) + Piecewise((x/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x)**2), True))*
log(x)/e - Piecewise((x/d**3, Eq(e, 0)), (-1/(2*d**2*e + 2*d*e**2*x) - log
(x)/(2*d**2*e) + log(d/e + x)/(2*d**2*e), True))/e + Piecewise((-1/(e**3*x
), Eq(d, 0)), (-1/(2*d*e**2 + 2*e**3*x) - log(d + e*x)/(2*d*e**2), True))/
(3*d) - Piecewise((1/(e**3*x), Eq(d, 0)), (-1/(2*d*(d/x + e)**2), True))*l
og(x)/(3*d) - 2*Piecewise((-1/(e**2*x), Eq(d, 0)), (-log(d**2 + d*e*x)/(d*
e), True))/(3*d*e) + 2*Piecewise((1/(e**2*x), Eq(d, 0)), (-1/(d**2/x + d*e
), True))*log(x)/(3*d*e) + Piecewise((-1/(e*x), Eq(d, 0)), (Piecewise((pol
ylog(2, d*exp_polar(I*pi)/(e*x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*
log(x) + polylog(2, d*exp_polar(I*pi)/(e*x)), Abs(x) < 1), (-log(e)*log(1/
x) + polylog(2, d*exp_polar(I*pi)/(e*x)), 1/Abs(x) < 1), (-meijerg(((), (1
, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*lo
g(e) + polylog(2, d*exp_polar(I*pi)/(e*x)), True))/d, True))/(3*d*e**2) -
Piecewise((1/(e*x), Eq(d, 0)), (log(d/x + e)/d, True))*log(x)/(3*d*e**2)
```

3.120.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 132, normalized size of antiderivative = 1.23

$$\int \frac{x\log^2(x)}{(d+ex)^4}\,dx = -\frac{d^2\log(x)^2 - 2\,(e^2\log(x) + e^2)x^2 - 2\,d^2 + \left(3\,de\log(x)^2 - 2\,de\log(x) - 4\,de\right)x}{6\,(de^5x^3 + 3\,d^2e^4x^2 + 3\,d^3e^3x + d^4e^2)} + \frac{\log(x)^2}{6\,d^2e^2} - \frac{\log\left(\frac{ex}{d} + 1\right)\log(x) + \mathrm{Li}_2\left(-\frac{ex}{d}\right)}{3\,d^2e^2}$$

input
```
integrate(x*log(x)^2/(e*x+d)^4,x, algorithm="maxima")
```

output
```
-1/6*(d^2*log(x)^2 - 2*(e^2*log(x) + e^2)*x^2 - 2*d^2 + (3*d*e*log(x)^2 -
2*d*e*log(x) - 4*d*e)*x)/(d*e^5*x^3 + 3*d^2*e^4*x^2 + 3*d^3*e^3*x + d^4*e^
2) + 1/6*log(x)^2/(d^2*e^2) - 1/3*(log(e*x/d + 1)*log(x) + dilog(-e*x/d))/
(d^2*e^2)
```

3.120.8 Giac [F]

$$\int \frac{x \log^2(x)}{(d+ex)^4}\, dx = \int \frac{x \log(x)^2}{(ex+d)^4}\, dx$$

input
```
integrate(x*log(x)^2/(e*x+d)^4,x, algorithm="giac")
```

output
```
integrate(x*log(x)^2/(e*x + d)^4, x)
```

3.120.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x \log^2(x)}{(d+ex)^4}\, dx = \int \frac{x \ln(x)^2}{(d+e\,x)^4}\, dx$$

input
```
int((x*log(x)^2)/(d + e*x)^4,x)
```

output
```
int((x*log(x)^2)/(d + e*x)^4, x)
```

3.121 $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx$

3.121.1 Optimal result

Integrand size = 23, antiderivative size = 113

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx = -\frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^3}{d} + \frac{3bn(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d} + \frac{6b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d} + \frac{6b^3n^3\operatorname{PolyLog}\left(4,-\frac{d}{ex}\right)}{d}$$

output
```
-ln(1+d/e/x)*(a+b*ln(c*x^n))^3/d+3*b*n*(a+b*ln(c*x^n))^2*polylog(2,-d/e/x)
/d+6*b^2*n^2*(a+b*ln(c*x^n))*polylog(3,-d/e/x)/d+6*b^3*n^3*polylog(4,-d/e/
x)/d
```

3.121.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 243 vs. 2(113) = 226.

Time = 0.14 (sec) , antiderivative size = 243, normalized size of antiderivative = 2.15

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx = \frac{4\log(x)(a-bn\log(x)+b\log(cx^n))^3 - 4(a-bn\log(x)+b\log(cx^n))^3\log(d+ex) + 6bn(a-bn\log(x)+ \cdots}{\cdots}$$

input
```
Integrate[(a + b*Log[c*x^n])^3/(x*(d + e*x)),x]
```

output
```
(4*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n])^3 - 4*(a - b*n*Log[x] + b*Log[c*
x^n])^3*Log[d + e*x] + 6*b*n*(a - b*n*Log[x] + b*Log[c*x^n])^2*(Log[x]^2 -
 2*(Log[x]*Log[1 + (e*x)/d] + PolyLog[2, -((e*x)/d)])) - 4*b^2*n^2*(-a + b
*n*Log[x] - b*Log[c*x^n])*(Log[x]^2*(Log[x] - 3*Log[1 + (e*x)/d]) - 6*Log[
x]*PolyLog[2, -((e*x)/d)] + 6*PolyLog[3, -((e*x)/d)]) + b^3*n^3*(Log[x]^4
- 4*Log[x]^3*Log[1 + (e*x)/d] - 12*Log[x]^2*PolyLog[2, -((e*x)/d)] + 24*Lo
g[x]*PolyLog[3, -((e*x)/d)] - 24*PolyLog[4, -((e*x)/d)]))/(4*d)
```

3.121.3 Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 104, normalized size of antiderivative = 0.92, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2779, 2821, 2830, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx$$

$$\Big\downarrow \text{2779}$$

$$\frac{3bn\int \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}$$

$$\Big\downarrow \text{2821}$$

$$\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\int \frac{(a+b\log(cx^n))\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}$$

$$\Big\downarrow \text{2830}$$

$$\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(bn\int \frac{\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{x}dx-\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}$$

$\downarrow$ 7143

$$\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(-\left(\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)-bn\,\text{PolyLog}\left(4,-\frac{d}{ex}\right)\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}$$

input
```
Int[(a + b*Log[c*x^n])^3/(x*(d + e*x)),x]
```

output
```
-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^3)/d) + (3*b*n*((a + b*Log[c*x^n])^
2*PolyLog[2, -(d/(e*x))] - 2*b*n*(-((a + b*Log[c*x^n])*PolyLog[3, -(d/(e*x
))]) - b*n*PolyLog[4, -(d/(e*x))])))/d
```

3.121.3.1 Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2830
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*PolyLog[k_, (e_.)*(x_)^(q_
.)])/(x_), x_Symbol] :> Simp[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^p/q)
, x] - Simp[b*n*(p/q)   Int[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, e, k, n, q}, x] && GtQ[p, 0]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.121. $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx$

3.121.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.55 (sec) , antiderivative size = 967, normalized size of antiderivative = 8.56

method	result	size
risch	Expression too large to display	967

input
```
int((a+b*ln(c*x^n))^3/x/(e*x+d),x,method=_RETURNVERBOSE)
```

output
```
-b^3*ln(x^n)^3/d*ln(e*x+d)+b^3*ln(x^n)^3/d*ln(x)-3/2*b^3*n/d*ln(x^n)^2*ln(
x)^2+b^3/d*n^2*ln(x^n)*ln(x)^3-1/4*b^3/d*ln(x)^4*n^3+3*b^3/d*ln(x)^2*ln(e*
x+d)*ln(-e*x/d)*n^3+3*b^3/d*ln(x)^2*dilog(-e*x/d)*n^3-6*b^3/d*ln(x)*ln(x^n
)*ln(e*x+d)*ln(-e*x/d)*n^2-6*b^3/d*ln(x)*ln(x^n)*dilog(-e*x/d)*n^2+3*b^3*n
/d*ln(x^n)^2*ln(e*x+d)*ln(-e*x/d)+3*b^3*n/d*ln(x^n)^2*dilog(-e*x/d)-2*b^3/
d*n^3*ln(e*x+d)*ln(x)^3+2*b^3/d*n^3*ln(x)^3*ln(1+e*x/d)+3*b^3/d*n^3*ln(x)^
2*polylog(2,-e*x/d)-6*b^3/d*n^3*polylog(4,-e*x/d)+3*b^3/d*n^2*ln(x)^2*ln(x
^n)*ln(e*x+d)-3*b^3/d*n^2*ln(x)^2*ln(x^n)*ln(1+e*x/d)-6*b^3/d*n^2*ln(x)*ln
(x^n)*polylog(2,-e*x/d)+6*b^3/d*n^2*ln(x^n)*polylog(3,-e*x/d)+1/8*(-I*b*Pi
*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*
Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^3*(-1
/d*ln(e*x+d)+1/d*ln(x))+3/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I
*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*
csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b^2*(-ln(x^n)^2/d*ln(e*x+d)+ln(x^n)^2/d*ln(
x)-2*n*(1/2/d*ln(x^n)*ln(x)^2-1/6/d*ln(x)^3*n-1/d*((ln(x^n)-n*ln(x))*(dilo
g(-e*x/d)+ln(e*x+d)*ln(-e*x/d))+n*(1/2*ln(e*x+d)*ln(x)^2-1/2*ln(x)^2*ln(1+
e*x/d)-ln(x)*polylog(2,-e*x/d)+polylog(3,-e*x/d)))))+3/4*(-I*b*Pi*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I
*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*b*(-ln(x^n)/
d*ln(e*x+d)+ln(x^n)/d*ln(x)-n*(1/2/d*ln(x)^2-1/d*ln(e*x+d)*ln(-e*x/d)-1...
```

3.121.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d),x, algorithm="fricas")
```

output
```
integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a
^3)/(e*x^2 + d*x), x)
```

3.121.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx = \int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**3/x/(e*x+d),x)
```

output
```
Integral((a + b*log(c*x**n))**3/(x*(d + e*x)), x)
```

3.121.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d),x, algorithm="maxima")
```

output
```
-a^3*(log(e*x + d)/d - log(x)/d) + integrate((b^3*log(c)^3 + b^3*log(x^n)^
3 + 3*a*b^2*log(c)^2 + 3*a^2*b*log(c) + 3*(b^3*log(c) + a*b^2)*log(x^n)^2
+ 3*(b^3*log(c)^2 + 2*a*b^2*log(c) + a^2*b)*log(x^n))/(e*x^2 + d*x), x)
```

3.121.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^3/((e*x + d)*x), x)
```

3.121.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^3}{x\,(d+e\,x)}\,dx$$

input
```
int((a + b*log(c*x^n))^3/(x*(d + e*x)),x)
```

output
```
int((a + b*log(c*x^n))^3/(x*(d + e*x)), x)
```

3.122 $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$

3.122.1 Optimal result

Integrand size = 23, antiderivative size = 217

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx = -\frac{ex(a+b\log(cx^n))^3}{d^2(d+ex)} - \frac{\log\left(1+\frac{d}{ex}\right)(a+b\log(cx^n))^3}{d^2} + \frac{3bn(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{d^2} + \frac{3bn(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,-\frac{d}{ex}\right)}{d^2} + \frac{6b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2} + \frac{6b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,-\frac{d}{ex}\right)}{d^2} - \frac{6b^3n^3\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^2} + \frac{6b^3n^3\operatorname{PolyLog}\left(4,-\frac{d}{ex}\right)}{d^2}$$

output
```
-e*x*(a+b*ln(c*x^n))^3/d^2/(e*x+d)-ln(1+d/e/x)*(a+b*ln(c*x^n))^3/d^2+3*b*n
*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/d^2+3*b*n*(a+b*ln(c*x^n))^2*polylog(2,-d/e/
x)/d^2+6*b^2*n^2*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^2+6*b^2*n^2*(a+b*ln(c
*x^n))*polylog(3,-d/e/x)/d^2-6*b^3*n^3*polylog(3,-e*x/d)/d^2+6*b^3*n^3*pol
ylog(4,-d/e/x)/d^2
```

3.122.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 432, normalized size of antiderivative = 1.99

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$$
$$= \frac{4d(a-bn\log(x)+b\log(cx^n))^3+4(d+ex)\log(x)(a-bn\log(x)+b\log(cx^n))^3-4(d+ex)(a-bn\log(}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^3/(x*(d + e*x)^2),x]
```

output
```
(4*d*(a - b*n*Log[x] + b*Log[c*x^n])^3 + 4*(d + e*x)*Log[x]*(a - b*n*Log[x
] + b*Log[c*x^n])^3 - 4*(d + e*x)*(a - b*n*Log[x] + b*Log[c*x^n])^3*Log[d
+ e*x] + 6*b*n*(a - b*n*Log[x] + b*Log[c*x^n])^2*(-2*e*x*Log[x] + (d + e*x
)*Log[x]^2 + 2*(d + e*x)*Log[d + e*x] - 2*(d + e*x)*(Log[x]*Log[1 + (e*x)/
d] + PolyLog[2, -((e*x)/d)])) + 4*b^2*n^2*(a - b*n*Log[x] + b*Log[c*x^n])*
(Log[x]*((d + e*x)*Log[x]^2 + 6*(d + e*x)*Log[1 + (e*x)/d] - 3*Log[x]*(e*x
 + (d + e*x)*Log[1 + (e*x)/d])) - 6*(d + e*x)*(-1 + Log[x])*PolyLog[2, -((
e*x)/d)] + 6*(d + e*x)*PolyLog[3, -((e*x)/d)]) + b^3*n^3*((d + e*x)*Log[x]
^4 - 4*(Log[x]^2*(e*x*Log[x] - 3*(d + e*x)*Log[1 + (e*x)/d]) - 6*(d + e*x)
*Log[x]*PolyLog[2, -((e*x)/d)] + 6*(d + e*x)*PolyLog[3, -((e*x)/d)]) - 4*(
d + e*x)*(Log[x]^3*Log[1 + (e*x)/d] + 3*Log[x]^2*PolyLog[2, -((e*x)/d)] -
6*Log[x]*PolyLog[3, -((e*x)/d)] + 6*PolyLog[4, -((e*x)/d)])))/(4*d^2*(d +
e*x))
```

3.122.3 Rubi [A] (verified)

Time = 1.01 (sec) , antiderivative size = 214, normalized size of antiderivative = 0.99, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {2789, 2755, 2754, 2779, 2821, 2830, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$$
$$\Big\downarrow \text{ 2789}$$
$$\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^3}{(d+ex)^2}dx}{d}$$

$$\Big\downarrow \text{2755}$$

$$\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\int \frac{(a+b\log(cx^n))^2}{d+ex}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2754}$$

$$\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{\frac{3bn\int \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2821}$$

$$\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\int \frac{(a+b\log(cx^n))\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\left(bn\int \frac{\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{x}dx-\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))\right)}{e}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{2830}$$

3.122. $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$

$$\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(bn\int\frac{\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{x}dx-\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\left(bn\int\frac{\text{PolyLog}\left(2,-\frac{ex}{d}\right)}{x}dx-\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))\right)}{e}\right)}{d}\right)}{d}$$

$\big\downarrow$ 7143

$$\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(-\left(\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)-bn\,\text{PolyLog}\left(4,-\frac{d}{ex}\right)\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\left(bn\,\text{PolyLog}\left(3,-\frac{ex}{d}\right)-\text{PolyLog}\left(2,-\frac{ex}{d}\right)(a+b\log(cx^n))\right)}{e}\right)}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^3/(x*(d + e*x)^2),x]
```

output
```
-((e*((x*(a + b*Log[c*x^n])^3)/(d*(d + e*x)) - (3*b*n*(((a + b*Log[c*x^n])
^2*Log[1 + (e*x)/d])/e - (2*b*n*(-((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d
)]) + b*n*PolyLog[3, -((e*x)/d)]))/e))/d))/d) + (-((Log[1 + d/(e*x)]*(a + 
b*Log[c*x^n])^3)/d) + (3*b*n*((a + b*Log[c*x^n])^2*PolyLog[2, -(d/(e*x))]
 - 2*b*n*(-((a + b*Log[c*x^n])*PolyLog[3, -(d/(e*x))]) - b*n*PolyLog[4, -(d
/(e*x))])))/d)/d
```

3.122. $\int\frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$

3.122.3.1 Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2830
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*PolyLog[k_, (e_.)*(x_)^(q_
.)])/(x_), x_Symbol] :> Simp[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^p/q)
, x] - Simp[b*n*(p/q)   Int[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, e, k, n, q}, x] && GtQ[p, 0]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.122. $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$

3.122.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.55 (sec) , antiderivative size = 1373, normalized size of antiderivative = 6.33

method	result	size
risch	Expression too large to display	1373

input
```
int((a+b*ln(c*x^n))^3/x/(e*x+d)^2,x,method=_RETURNVERBOSE)
```

output
```
6*b^3/d^2*ln(e*x+d)*ln(-e*x/d)*ln(x)*n^3-6*b^3/d^2*n^2*ln(x^n)*ln(e*x+d)*l
n(-e*x/d)+3*b^3/d^2*ln(e*x+d)*ln(-e*x/d)*ln(x)^2*n^3-6*b^3/d^2*ln(x^n)*dil
og(-e*x/d)*ln(x)*n^2+3*b^3/d^2*n^2*ln(x^n)*ln(e*x+d)*ln(x)^2-6*b^3/d^2*ln(
x^n)*ln(e*x+d)*ln(-e*x/d)*ln(x)*n^2+3/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^
n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b^2*(-ln(x^n)^2/d^2*ln(e*x+d)+l
n(x^n)^2/d/(e*x+d)+ln(x^n)^2/d^2*ln(x)-2*n*(-ln(x^n)/d^2*ln(e*x+d)+ln(x^n)
/d^2*ln(x)-1/2/d^2*n*ln(x)^2+1/d^2*n*ln(e*x+d)*ln(-e*x/d)+1/d^2*n*dilog(-e
*x/d)+1/2/d^2*ln(x^n)*ln(x)^2-1/6/d^2*ln(x)^3*n-1/d^2*((ln(x^n)-n*ln(x))*(
dilog(-e*x/d)+ln(e*x+d)*ln(-e*x/d))+n*(1/2*ln(e*x+d)*ln(x)^2-1/2*ln(x)^2*l
n(1+e*x/d)-ln(x)*polylog(2,-e*x/d)+polylog(3,-e*x/d)))))-2*b^3/d^2*n^3*ln(
e*x+d)*ln(x)^3+2*b^3/d^2*n^3*ln(x)^3*ln(1+e*x/d)+3*b^3*n/d^2*ln(x^n)^2*dil
og(-e*x/d)+3*b^3*n*ln(x^n)^2/d^2*ln(e*x+d)-3*b^3*n*ln(x^n)^2/d^2*ln(x)+3*b
^3/d^2*n^3*ln(x)^2*polylog(2,-e*x/d)+6*b^3/d^2*n^2*ln(x^n)*polylog(3,-e*x/
d)+b^3/d^2*n^2*ln(x^n)*ln(x)^3-3/2*b^3*n/d^2*ln(x^n)^2*ln(x)^2+3*b^3/d^2*n
^2*ln(x^n)*ln(x)^2+6*b^3/d^2*dilog(-e*x/d)*ln(x)*n^3-6*b^3/d^2*n^2*ln(x^n)
*dilog(-e*x/d)-3*b^3/d^2*n^3*ln(e*x+d)*ln(x)^2+3*b^3/d^2*n^3*ln(x)^2*ln(1+
e*x/d)+6*b^3/d^2*n^3*ln(x)*polylog(2,-e*x/d)+3*b^3/d^2*dilog(-e*x/d)*ln(x)
^2*n^3+3/4*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*c
sgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^...
```

3.122.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a
^3)/(e^2*x^3 + 2*d*e*x^2 + d^2*x), x)
```

3.122.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx = \int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**3/x/(e*x+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**3/(x*(d + e*x)**2), x)
```

3.122.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d)^2,x, algorithm="maxima")
```

output
```
a^3*(1/(d*e*x + d^2) - log(e*x + d)/d^2 + log(x)/d^2) + integrate((b^3*log
(c)^3 + b^3*log(x^n)^3 + 3*a*b^2*log(c)^2 + 3*a^2*b*log(c) + 3*(b^3*log(c)
 + a*b^2)*log(x^n)^2 + 3*(b^3*log(c)^2 + 2*a*b^2*log(c) + a^2*b)*log(x^n))
/(e^2*x^3 + 2*d*e*x^2 + d^2*x), x)
```

3.122.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^3/((e*x + d)^2*x), x)
```

3.122.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^3}{x\,(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^3/(x*(d + e*x)^2),x)
```

output
```
int((a + b*log(c*x^n))^3/(x*(d + e*x)^2), x)
```

3.123 $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx$

3.123.1 Optimal result

Integrand size = 23, antiderivative size = 361

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx &= \frac{3benx(a+b\log(cx^n))^2}{2d^3(d+ex)} - \frac{(a+b\log(cx^n))^3}{2d^3} \\
&+ \frac{(a+b\log(cx^n))^3}{2d(d+ex)^2} - \frac{ex(a+b\log(cx^n))^3}{d^3(d+ex)} \\
&+ \frac{(a+b\log(cx^n))^4}{4bd^3n} - \frac{3b^2n^2(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^3} \\
&+ \frac{9bn(a+b\log(cx^n))^2\log\left(1+\frac{ex}{d}\right)}{2d^3} \\
&- \frac{(a+b\log(cx^n))^3\log\left(1+\frac{ex}{d}\right)}{d^3} - \frac{3b^3n^3\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3} \\
&+ \frac{9b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3} \\
&- \frac{3bn(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^3} \\
&- \frac{9b^3n^3\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^3} \\
&+ \frac{6b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^3} \\
&- \frac{6b^3n^3\operatorname{PolyLog}\left(4,-\frac{ex}{d}\right)}{d^3}\end{aligned}$$

output
```
3/2*b*e*n*x*(a+b*ln(c*x^n))^2/d^3/(e*x+d)-1/2*(a+b*ln(c*x^n))^3/d^3+1/2*(a
+b*ln(c*x^n))^3/d/(e*x+d)^2-e*x*(a+b*ln(c*x^n))^3/d^3/(e*x+d)+1/4*(a+b*ln(
c*x^n))^4/b/d^3/n-3*b^2*n^2*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^3+9/2*b*n*(a+b*l
n(c*x^n))^2*ln(1+e*x/d)/d^3-(a+b*ln(c*x^n))^3*ln(1+e*x/d)/d^3-3*b^3*n^3*po
lylog(2,-e*x/d)/d^3+9*b^2*n^2*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^3-3*b*n*
(a+b*ln(c*x^n))^2*polylog(2,-e*x/d)/d^3-9*b^3*n^3*polylog(3,-e*x/d)/d^3+6*
b^2*n^2*(a+b*ln(c*x^n))*polylog(3,-e*x/d)/d^3-6*b^3*n^3*polylog(4,-e*x/d)/
d^3
```

3.123.2 Mathematica [A] (verified)

Time = 0.63 (sec) , antiderivative size = 706, normalized size of antiderivative = 1.96

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx$$
$$= \frac{2d^2(a-bn\log(x)+b\log(cx^n))^3+4d(d+ex)\,(a-bn\log(x)+b\log(cx^n))^3+4(d+ex)^2\log(x)\,(a-bn\log\ldots}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^3/(x*(d + e*x)^3),x]
```

output
```
(2*d^2*(a - b*n*Log[x] + b*Log[c*x^n])^3 + 4*d*(d + e*x)*(a - b*n*Log[x] +
 b*Log[c*x^n])^3 + 4*(d + e*x)^2*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n])^3
- 4*(d + e*x)^2*(a - b*n*Log[x] + b*Log[c*x^n])^3*Log[d + e*x] + 6*b*n*(a
- b*n*Log[x] + b*Log[c*x^n])^2*((d + e*x)^2*Log[x]^2 + (d + e*x)*(-d + 3*(
d + e*x)*Log[d + e*x]) - Log[x]*(e*x*(4*d + 3*e*x) + 2*(d + e*x)^2*Log[1 +
 (e*x)/d]) - 2*(d + e*x)^2*PolyLog[2, -((e*x)/d)]) + 2*b^2*n^2*(a - b*n*Lo
g[x] + b*Log[c*x^n])*(-3*e*x*(2*d + e*x)*Log[x]^2 + 2*(d + e*x)^2*Log[x]^3
 - 6*(d + e*x)^2*Log[d + e*x] + 6*(d + e*x)*Log[x]*(e*x + (d + e*x)*Log[1
+ (e*x)/d]) + 6*(d + e*x)^2*PolyLog[2, -((e*x)/d)] - 6*(d + e*x)*(Log[x]*(
e*x*Log[x] - 2*(d + e*x)*Log[1 + (e*x)/d]) - 2*(d + e*x)*PolyLog[2, -((e*x
)/d)]) - 6*(d + e*x)^2*(Log[x]^2*Log[1 + (e*x)/d] + 2*Log[x]*PolyLog[2, -(
(e*x)/d)] - 2*PolyLog[3, -((e*x)/d)])) + b^3*n^3*((d + e*x)^2*Log[x]^4 - 4
*(d + e*x)*(Log[x]^2*(e*x*Log[x] - 3*(d + e*x)*Log[1 + (e*x)/d]) - 6*(d +
e*x)*Log[x]*PolyLog[2, -((e*x)/d)] + 6*(d + e*x)*PolyLog[3, -((e*x)/d)]) -
 2*(Log[x]*(e*x*(2*d + e*x)*Log[x]^2 + 6*(d + e*x)^2*Log[1 + (e*x)/d] - 3*
(d + e*x)*Log[x]*(e*x + (d + e*x)*Log[1 + (e*x)/d])) - 6*(d + e*x)^2*(-1 +
 Log[x])*PolyLog[2, -((e*x)/d)] + 6*(d + e*x)^2*PolyLog[3, -((e*x)/d)]) -
4*(d + e*x)^2*(Log[x]^3*Log[1 + (e*x)/d] + 3*Log[x]^2*PolyLog[2, -((e*x)/d
)] - 6*Log[x]*PolyLog[3, -((e*x)/d)] + 6*PolyLog[4, -((e*x)/d)])))/(4*d^3*
(d + e*x)^2)
```

3.123.3 Rubi [A] (verified)

Time = 2.01 (sec) , antiderivative size = 416, normalized size of antiderivative = 1.15, number of steps used = 10, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.435, Rules used = {2789, 2756, 2789, 2755, 2754, 2779, 2821, 2830, 2838, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx$$

$$\Big\downarrow \text{2789}$$

$$\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^3}{(d+ex)^3}dx}{d}$$

$$\Big\downarrow \text{2756}$$

$$\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^2}dx}{d}-\frac{e\left(\frac{3bn\int \frac{(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{2e}-\frac{(a+b\log(cx^n))^3}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{2789}$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^3}{(d+ex)^2}dx}{d}}{d}-\frac{e\left(\frac{3bn\left(\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\int \frac{(a+b\log(cx^n))^2}{(d+ex)^2}dx}{d}\right)}{2e}-\frac{(a+b\log(cx^n))^3}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow \text{2755}$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\int \frac{(a+b\log(cx^n))^2}{d+ex}dx}{d}\right)}{d}}{d}-\frac{e\left(\frac{3bn\left(\frac{\int \frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\int \frac{a+b\log(cx^n)}{d+ex}dx}{d}\right)}{d}\right)}{2e}-\frac{(a+b\log(cx^n))^3}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow 2754$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^3}{x(d+ex)}dx}{d} - \frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)} - \frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e} - \frac{2bn\int\frac{(a+b\log(cx^n))\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}}{d} - \frac{e\left(\frac{3bn\left(\frac{\int\frac{(a+b\log(cx^n))^2}{x(d+ex)}dx}{d} - \frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)} - \frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e} - \frac{bn\int\frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}\right)}{2e} - \frac{(a+b\log(cx^n))^3}{2e(d+ex)^2}\right)}{d}$$

$$\Big\downarrow 2779$$

3.123. $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\, dx$

$$\frac{\frac{\frac{3bn\int \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))^2}{e}-\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{ex}{d}\right.}{x}}{e}\right.}{d}\right.}{d}}{d}$$

$$\frac{e\left(\frac{3bn\left(\frac{\frac{2bn\int \frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))}{x}dx}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}-\frac{bn\int \frac{\log\left(\frac{ex}{d}+1\right)}{x}dx}{e}\right)}{d}\right)}{d}\right.}{2e}\right.}{d}$$

$\downarrow$ 2821

3.123. $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx$

$$\frac{\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\int\frac{(a+b\log(cx^n))\,\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^3}{d(d+ex)}-\frac{3bn\left(\frac{\log\left(\frac{ex}{d}+1\right)\cdots}{\cdots}\right.}{\cdots}\right.}{\cdots}}{d}$$

$$\frac{e\left(\frac{3bn\left(\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(\cdots}{e}\right.}{\cdots}\right.}{d}\cdots\right.}{2e}\cdots\right.}{d}$$

$$\Big\downarrow \; 2830$$

3.123. $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx$

$$\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(bn\int\frac{\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{x}dx-\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx}{d(d+ex}\right.}{d}$$

$$\frac{e\left(\frac{3bn\left(\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(}{e}\right.}{}\right.}{d}\right.}{2e}\right.}{d}$$

$$\Big\downarrow \text{2838}$$

3.123. $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx$

$$\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(bn\int\frac{\text{PolyLog}\left(3,-\frac{d}{ex}\right)}{x}dx-\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx}{d(d+ex}\right.}{d}$$

$$\frac{e\left(\frac{3bn\left(\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))-bn\int\frac{\text{PolyLog}\left(2,-\frac{d}{ex}\right)}{x}dx\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(\right.}{e}\right.}{d}\right.}{2e}\right.}{d}$$

$\downarrow$ 7143

$$\frac{\frac{3bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))^2-2bn\left(-\left(\text{PolyLog}\left(3,-\frac{d}{ex}\right)(a+b\log(cx^n))\right)-bn\,\text{PolyLog}\left(4,-\frac{d}{ex}\right)\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^3}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n)}{d(d+ex)}\right.}{d}$$

$$\frac{e\left(\frac{3bn\left(\frac{\frac{2bn\left(\text{PolyLog}\left(2,-\frac{d}{ex}\right)(a+b\log(cx^n))+bn\,\text{PolyLog}\left(3,-\frac{d}{ex}\right)\right)}{d}-\frac{\log\left(\frac{d}{ex}+1\right)(a+b\log(cx^n))^2}{d}}{d}-\frac{e\left(\frac{x(a+b\log(cx^n))^2}{d(d+ex)}-\frac{2bn\left(\frac{\log\left(\frac{ex}{d}+1\right)(a+b\log(cx^n))}{e}\right.}{d}\right.}{d}\right.}{2e}\right.}{d}$$

3.123. $\int\frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx$

input
```
Int[(a + b*Log[c*x^n])^3/(x*(d + e*x)^3),x]
```

output
```
-((e*(-1/2*(a + b*Log[c*x^n])^3/(e*(d + e*x)^2) + (3*b*n*(-((e*((x*(a + b*
Log[c*x^n])^2)/(d*(d + e*x)) - (2*b*n*(((a + b*Log[c*x^n])*Log[1 + (e*x)/d
])/e + (b*n*PolyLog[2, -((e*x)/d)])/e))/d))/d) + (-((Log[1 + d/(e*x)]*(a +
 b*Log[c*x^n])^2)/d) + (2*b*n*((a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x))] +
 b*n*PolyLog[3, -(d/(e*x))]))/d)/d))/(2*e)))/d) + (-((e*((x*(a + b*Log[c*x
^n])^3)/(d*(d + e*x)) - (3*b*n*(((a + b*Log[c*x^n])^2*Log[1 + (e*x)/d])/e
- (2*b*n*(-((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)]) + b*n*PolyLog[3, -(
(e*x)/d)]))/e))/d))/d) + (-((Log[1 + d/(e*x)]*(a + b*Log[c*x^n])^3)/d) + (
3*b*n*((a + b*Log[c*x^n])^2*PolyLog[2, -(d/(e*x))] - 2*b*n*(-((a + b*Log[c
*x^n])*PolyLog[3, -(d/(e*x))]) - b*n*PolyLog[4, -(d/(e*x))])))/d)/d)/d
```

3.123.3.1 Defintions of rubi rules used

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

3.123. $\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx$

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2830
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*PolyLog[k_, (e_.)*(x_)^(q_
.)])/(x_), x_Symbol] :> Simp[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^p/q)
, x] - Simp[b*n*(p/q)   Int[PolyLog[k + 1, e*x^q]*((a + b*Log[c*x^n])^(p -
1)/x), x], x] /; FreeQ[{a, b, c, e, k, n, q}, x] && GtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.123.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.63 (sec) , antiderivative size = 1607, normalized size of antiderivative = 4.45

method	result	size
risch	Expression too large to display	1607

input
```
int((a+b*ln(c*x^n))^3/x/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-6*b^3/d^3*ln(x)*ln(x^n)*ln(e*x+d)*ln(-e*x/d)*n^2+3/4*(-I*b*Pi*csgn(I*c)*c
sgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^
n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*b*(-ln(x^n)/d^3
*ln(e*x+d)+ln(x^n)/d^2/(e*x+d)+1/2*ln(x^n)/d/(e*x+d)^2+ln(x^n)/d^3*ln(x)-1
/2*n*(1/d^2/(e*x+d)-3/d^3*ln(e*x+d)+3/d^3*ln(x)+1/d^3*ln(x)^2-2/d^3*ln(e*x
+d)*ln(-e*x/d)-2/d^3*dilog(-e*x/d)))+3/2*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x
^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b^2*(-ln(x^n)^2/d^3*ln(e*x+d)+
ln(x^n)^2/d^2/(e*x+d)+1/2*ln(x^n)^2/d/(e*x+d)^2+ln(x^n)^2/d^3*ln(x)-n*(1/d
^2*(ln(x^n)/(e*x+d)-3*ln(x^n)/d*ln(e*x+d)+3*ln(x^n)/d*ln(x)-n*(-1/d*ln(e*x
+d)+1/d*ln(x)+3/2/d*ln(x)^2-3/d*ln(e*x+d)*ln(-e*x/d)-3/d*dilog(-e*x/d)))+1
/d^3*ln(x^n)*ln(x)^2-1/3/d^3*ln(x)^3*n-2/d^3*((ln(x^n)-n*ln(x))*(dilog(-e*
x/d)+ln(e*x+d)*ln(-e*x/d))+n*(1/2*ln(e*x+d)*ln(x)^2-1/2*ln(x)^2*ln(1+e*x/d
)-ln(x)*polylog(2,-e*x/d)+polylog(3,-e*x/d)))))+1/8*(-I*b*Pi*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)
*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^3*(-1/d^3*ln(e*x+d)
+1/d^2/(e*x+d)+1/2/d/(e*x+d)^2+1/d^3*ln(x))-9/2*b^3/d^3*n^3*ln(e*x+d)*ln(x
)^2-3/2*b^3/d^3*n^3*ln(x)^2+3*b^3/d^3*n^3*dilog(-e*x/d)-3/2*b^3/d^3*ln(x)^
3*n^3-1/4*b^3/d^3*ln(x)^4*n^3-b^3*ln(x^n)^3/d^3*ln(e*x+d)+b^3*ln(x^n)^3/d^
2/(e*x+d)+1/2*b^3*ln(x^n)^3/d/(e*x+d)^2+b^3*ln(x^n)^3/d^3*ln(x)+9*b^3/d...
```

3.123.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a
^3)/(e^3*x^4 + 3*d*e^2*x^3 + 3*d^2*e*x^2 + d^3*x), x)
```

3.123.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx = \int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**3/x/(e*x+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))**3/(x*(d + e*x)**3), x)
```

3.123.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)^3 x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*a^3*((2*e*x + 3*d)/(d^2*e^2*x^2 + 2*d^3*e*x + d^4) - 2*log(e*x + d)/d^
3 + 2*log(x)/d^3) + integrate((b^3*log(c)^3 + b^3*log(x^n)^3 + 3*a*b^2*log
(c)^2 + 3*a^2*b*log(c) + 3*(b^3*log(c) + a*b^2)*log(x^n)^2 + 3*(b^3*log(c)
^2 + 2*a*b^2*log(c) + a^2*b)*log(x^n))/(e^3*x^4 + 3*d*e^2*x^3 + 3*d^2*e*x^
2 + d^3*x), x)
```

3.123.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex+d)^3 x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/x/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^3/((e*x + d)^3*x), x)
```

3.123.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^3}{x(d+ex)^3}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^3}{x\,(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))^3/(x*(d + e*x)^3),x)
```

output
```
int((a + b*log(c*x^n))^3/(x*(d + e*x)^3), x)
```

3.124 $\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx$

3.124.1 Optimal result

Integrand size = 20, antiderivative size = 189

$$\begin{aligned}\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx =& -\frac{1}{2}\sqrt{b}de^{-\frac{a}{bn}}\sqrt{n}\sqrt{\pi}x(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)\\ &-\frac{1}{4}\sqrt{b}ee^{-\frac{2a}{bn}}\sqrt{n}\sqrt{\frac{\pi}{2}}x^2(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)\\ &+dx\sqrt{a+b\log(cx^n)}+\frac{1}{2}ex^2\sqrt{a+b\log(cx^n)}\end{aligned}$$

output
```
-1/8*e*x^2*erfi(2^(1/2)*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)*n^(
1/2)*2^(1/2)*Pi^(1/2)/exp(2*a/b/n)/((c*x^n)^(2/n))-1/2*d*x*erfi((a+b*ln(c*
x^n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)*n^(1/2)*Pi^(1/2)/exp(a/b/n)/((c*x^n)^
(1/n))+d*x*(a+b*ln(c*x^n))^(1/2)+1/2*e*x^2*(a+b*ln(c*x^n))^(1/2)
```

3.124.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 169, normalized size of antiderivative = 0.89

$$\begin{aligned}&\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx\\ &=\frac{1}{8}x\left(-4\sqrt{b}de^{-\frac{a}{bn}}\sqrt{n}\sqrt{\pi}(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)\right.\\ &\quad\left.-\sqrt{b}ee^{-\frac{2a}{bn}}\sqrt{n}\sqrt{2\pi}x(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+4(2d+ex)\sqrt{a+b\log(cx^n)}\right)\end{aligned}$$

input
```
Integrate[(d + e*x)*Sqrt[a + b*Log[c*x^n]],x]
```

output
```
(x*((-4*Sqrt[b]*d*Sqrt[n]*Sqrt[Pi]*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*Sq
rt[n])]])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (Sqrt[b]*e*Sqrt[n]*Sqrt[2*Pi]*x*Er
fi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])]])/(E^((2*a)/(b*n))*(
c*x^n)^(2/n)) + 4*(2*d + e*x)*Sqrt[a + b*Log[c*x^n]]))/8
```

3.124.3 Rubi [A] (verified)

Time = 0.48 (sec) , antiderivative size = 189, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(d\sqrt{a+b\log(cx^n)}+ex\sqrt{a+b\log(cx^n)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{1}{2}\sqrt{\pi}\sqrt{b}d\sqrt{n}xe^{-\frac{a}{bn}}(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+dx\sqrt{a+b\log(cx^n)}-\frac{1}{4}\sqrt{\frac{\pi}{2}}\sqrt{b}e\sqrt{n}x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+\frac{1}{2}ex^2\sqrt{a+b\log(cx^n)}$$

input
```
Int[(d + e*x)*Sqrt[a + b*Log[c*x^n]],x]
```

output
```
-1/2*(Sqrt[b]*d*Sqrt[n]*Sqrt[Pi]*x*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*Sq
rt[n])]])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (Sqrt[b]*e*Sqrt[n]*Sqrt[Pi/2]*x^2*
Erfi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])]])/(4*E^((2*a)/(b*n
))*(c*x^n)^(2/n)) + d*x*Sqrt[a + b*Log[c*x^n]] + (e*x^2*Sqrt[a + b*Log[c*x
^n]])/2
```

3.124.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

3.124.4 Maple [F]

$$\int (ex+d)\sqrt{a+b\ln(c\,x^n)}dx$$

input
```
int((e*x+d)*(a+b*ln(c*x^n))^(1/2),x)
```

output
```
int((e*x+d)*(a+b*ln(c*x^n))^(1/2),x)
```

3.124.5 Fricas [F(-2)]

Exception generated.

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

3.124.6 Sympy [F]

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx = \int \sqrt{a+b\log(cx^n)}(d+ex)\,dx$$

input
```
integrate((e*x+d)*(a+b*ln(c*x**n))**(1/2),x)
```

output
```
Integral(sqrt(a + b*log(c*x**n))*(d + e*x), x)
```

3.124.7 Maxima [F]

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx = \int (ex+d)\sqrt{b\log(cx^n)+a}\,dx$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
```

output
```
integrate((e*x + d)*sqrt(b*log(c*x^n) + a), x)
```

3.124.8 Giac [F]

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx = \int (ex+d)\sqrt{b\log(cx^n)+a}\,dx$$

input
```
integrate((e*x+d)*(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

output
```
integrate((e*x + d)*sqrt(b*log(c*x^n) + a), x)
```

3.124.9 Mupad [F(-1)]

Timed out.

$$\int (d+ex)\sqrt{a+b\log(cx^n)}\,dx = \int \sqrt{a+b\,\ln(c\,x^n)}\,(d+e\,x)\;dx$$

input
```
int((a + b*log(c*x^n))^(1/2)*(d + e*x),x)
```

output
```
int((a + b*log(c*x^n))^(1/2)*(d + e*x), x)
```

3.125 $\int (d+ex)^2 \sqrt{a+b\log(cx^n)}\,dx$

3.125.1 Optimal result

Integrand size = 22, antiderivative size = 298

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx = -\frac{1}{2}\sqrt{b}d^2e^{-\frac{a}{bn}}\sqrt{n}\sqrt{\pi}x(cx^n)^{-1/n}\,\text{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right) - \frac{1}{2}\sqrt{b}dee^{-\frac{2a}{bn}}\sqrt{n}\sqrt{\frac{\pi}{2}}x^2(cx^n)^{-2/n}\,\text{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right) - \frac{1}{6}\sqrt{b}e^2e^{-\frac{3a}{bn}}\sqrt{n}\sqrt{\frac{\pi}{3}}x^3(cx^n)^{-3/n}\,\text{erfi}\left(\frac{\sqrt{3}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right) + d^2x\sqrt{a+b\log(cx^n)} + dex^2\sqrt{a+b\log(cx^n)}$$

output

```
-1/18*e^2*x^3*erfi(3^(1/2)*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)*
n^(1/2)*3^(1/2)*Pi^(1/2)/exp(3*a/b/n)/((c*x^n)^(3/n))-1/4*d*e*x^2*erfi(2^(
1/2)*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)*n^(1/2)*2^(1/2)*Pi^(1/
2)/exp(2*a/b/n)/((c*x^n)^(2/n))-1/2*d^2*x*erfi((a+b*ln(c*x^n))^(1/2)/b^(1/
2)/n^(1/2))*b^(1/2)*n^(1/2)*Pi^(1/2)/exp(a/b/n)/((c*x^n)^(1/n))+d^2*x*(a+b
*ln(c*x^n))^(1/2)+d*e*x^2*(a+b*ln(c*x^n))^(1/2)+1/3*e^2*x^3*(a+b*ln(c*x^n)
)^(1/2)
```

3.125.2 Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 287, normalized size of antiderivative = 0.96

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx$$
$$= \frac{1}{36}x\left(-18\sqrt{b}d^2e^{-\frac{a}{bn}}\sqrt{n}\sqrt{\pi}(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)\right.$$
$$-9\sqrt{b}dee^{-\frac{2a}{bn}}\sqrt{n}\sqrt{2\pi}x(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)-2\sqrt{b}e^2e^{-\frac{3a}{bn}}\sqrt{n}\sqrt{3\pi}x^2(cx^n)^{-3/n}\operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{a}\right.$$

input
```
Integrate[(d + e*x)^2*Sqrt[a + b*Log[c*x^n]],x]
```

output
```
(x*((-18*Sqrt[b]*d^2*Sqrt[n]*Sqrt[Pi]*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]
*Sqrt[n])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (9*Sqrt[b]*d*e*Sqrt[n]*Sqrt[2*P
i]*x*Erfi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(E^((2*a)/(
b*n))*(c*x^n)^(2/n)) - (2*Sqrt[b]*e^2*Sqrt[n]*Sqrt[3*Pi]*x^2*Erfi[(Sqrt[3]
*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(E^((3*a)/(b*n))*(c*x^n)^(3/n
)) + 36*d^2*Sqrt[a + b*Log[c*x^n]] + 36*d*e*x*Sqrt[a + b*Log[c*x^n]] + 12*
e^2*x^2*Sqrt[a + b*Log[c*x^n]]))/36
```

3.125.3 Rubi [A] (verified)

Time = 0.71 (sec) , antiderivative size = 298, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx$$
$$\Big\downarrow \; 2767$$
$$\int \left(d^2\sqrt{a+b\log(cx^n)}+2dex\sqrt{a+b\log(cx^n)}+e^2x^2\sqrt{a+b\log(cx^n)}\right)dx$$
$$\Big\downarrow \; 2009$$

$$-\frac{1}{2}\sqrt{\pi}\sqrt{b}d^2\sqrt{n}xe^{-\frac{a}{bn}}(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+d^2x\sqrt{a+b\log(cx^n)}-\frac{1}{2}\sqrt{\frac{\pi}{2}}\sqrt{b}de\sqrt{n}x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+dex^2\sqrt{a+b\log(cx^n)}-\frac{1}{6}\sqrt{\frac{\pi}{3}}\sqrt{b}e^2\sqrt{n}x^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+\frac{1}{3}e^2x^3\sqrt{a+b\log(cx^n)}$$

input
```
Int[(d + e*x)^2*Sqrt[a + b*Log[c*x^n]],x]
```

output
```
-1/2*(Sqrt[b]*d^2*Sqrt[n]*Sqrt[Pi]*x*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*
Sqrt[n])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (Sqrt[b]*d*e*Sqrt[n]*Sqrt[Pi/2]*
x^2*Erfi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(2*E^((2*a)/
(b*n))*(c*x^n)^(2/n)) - (Sqrt[b]*e^2*Sqrt[n]*Sqrt[Pi/3]*x^3*Erfi[(Sqrt[3]*
Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(6*E^((3*a)/(b*n))*(c*x^n)^(3/
n)) + d^2*x*Sqrt[a + b*Log[c*x^n]] + d*e*x^2*Sqrt[a + b*Log[c*x^n]] + (e^2
*x^3*Sqrt[a + b*Log[c*x^n]])/3
```

3.125.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

3.125.4 Maple [F]

$$\int (ex+d)^2\sqrt{a+b\ln(c\,x^n)}dx$$

input
```
int((e*x+d)^2*(a+b*ln(c*x^n))^(1/2),x)
```

output
```
int((e*x+d)^2*(a+b*ln(c*x^n))^(1/2),x)
```

3.125.5 Fricas [F(-2)]

Exception generated.

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

3.125.6 Sympy [F]

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx = \int \sqrt{a+b\log(cx^n)}(d+ex)^2\,dx$$

input
```
integrate((e*x+d)**2*(a+b*ln(c*x**n))**(1/2),x)
```

output
```
Integral(sqrt(a + b*log(c*x**n))*(d + e*x)**2, x)
```

3.125.7 Maxima [F]

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx = \int (ex+d)^2\sqrt{b\log(cx^n)+a}\,dx$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
```

output
```
integrate((e*x + d)^2*sqrt(b*log(c*x^n) + a), x)
```

3.125.8 Giac [F]

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx=\int (ex+d)^2\sqrt{b\log(cx^n)+a}\,dx$$

input
```
integrate((e*x+d)^2*(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

output
```
integrate((e*x + d)^2*sqrt(b*log(c*x^n) + a), x)
```

3.125.9 Mupad [F(-1)]

Timed out.

$$\int (d+ex)^2\sqrt{a+b\log(cx^n)}\,dx=\int \sqrt{a+b\,\ln(c\,x^n)}\,(d+e\,x)^2\,dx$$

input
```
int((a + b*log(c*x^n))^(1/2)*(d + e*x)^2,x)
```

output
```
int((a + b*log(c*x^n))^(1/2)*(d + e*x)^2, x)
```

3.126 $\int (d+ex)^3 \sqrt{a+b\log(cx^n)}\,dx$

3.126.1 Optimal result

Integrand size = 22, antiderivative size = 402

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx = -\frac{1}{2}\sqrt{b}d^3e^{-\frac{a}{bn}}\sqrt{n}\sqrt{\pi}x(cx^n)^{-1/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)$$
$$-\frac{1}{16}\sqrt{b}e^3e^{-\frac{4a}{bn}}\sqrt{n}\sqrt{\pi}x^4(cx^n)^{-4/n}\operatorname{erfi}\left(\frac{2\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)$$
$$-\frac{3}{4}\sqrt{b}d^2ee^{-\frac{2a}{bn}}\sqrt{n}\sqrt{\frac{\pi}{2}}x^2(cx^n)^{-2/n}\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)-\frac{1}{2}\sqrt{b}de^2e^{-\frac{3a}{bn}}\sqrt{n}\sqrt{\frac{\pi}{3}}x^3(cx^n)^{-3/n}\operatorname{erfi}\Bigg(\frac{\sqrt{3}}{\ }$$

output
```
-1/6*d*e^2*x^3*erfi(3^(1/2)*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)
*n^(1/2)*3^(1/2)*Pi^(1/2)/exp(3*a/b/n)/((c*x^n)^(3/n))-3/8*d^2*e*x^2*erfi(
2^(1/2)*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)*n^(1/2)*2^(1/2)*Pi^
(1/2)/exp(2*a/b/n)/((c*x^n)^(2/n))-1/2*d^3*x*erfi((a+b*ln(c*x^n))^(1/2)/b^
(1/2)/n^(1/2))*b^(1/2)*n^(1/2)*Pi^(1/2)/exp(a/b/n)/((c*x^n)^(1/n))-1/16*e^
3*x^4*erfi(2*(a+b*ln(c*x^n))^(1/2)/b^(1/2)/n^(1/2))*b^(1/2)*n^(1/2)*Pi^(1/
2)/exp(4*a/b/n)/((c*x^n)^(4/n))+d^3*x*(a+b*ln(c*x^n))^(1/2)+3/2*d^2*e*x^2*
(a+b*ln(c*x^n))^(1/2)+d*e^2*x^3*(a+b*ln(c*x^n))^(1/2)+1/4*e^3*x^4*(a+b*ln(
c*x^n))^(1/2)
```

3.126.2 Mathematica [A] (verified)

Time = 0.42 (sec) , antiderivative size = 366, normalized size of antiderivative = 0.91

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx$$
$$=\frac{1}{48}e^{-\frac{4a}{bn}}x(cx^n)^{-4/n}\left(-24\sqrt{b}d^3e^{\frac{3a}{bn}}\sqrt{n}\sqrt{\pi}(cx^n)^{3/n}\operatorname{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)-3\sqrt{b}e^3\sqrt{n}\sqrt{\pi}x^3\operatorname{erfi}\left(\frac{2\sqrt{a+b}}{\sqrt{b}}\right.\right.$$

input
```
Integrate[(d + e*x)^3*Sqrt[a + b*Log[c*x^n]],x]
```

output
```
(x*(-24*Sqrt[b]*d^3*E^((3*a)/(b*n))*Sqrt[n]*Sqrt[Pi]*(c*x^n)^(3/n)*Erfi[Sq
rt[a + b*Log[c*x^n]]/(Sqrt[b]*Sqrt[n])] - 3*Sqrt[b]*e^3*Sqrt[n]*Sqrt[Pi]*x
^3*Erfi[(2*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])] + 2*E^(a/(b*n))*(c*x
^n)^n^(-1)*(-9*Sqrt[b]*d^2*e*E^(a/(b*n))*Sqrt[n]*Sqrt[2*Pi]*x*(c*x^n)^n^(-
1)*Erfi[(Sqrt[2]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])] - 4*Sqrt[b]*d*
e^2*Sqrt[n]*Sqrt[3*Pi]*x^2*Erfi[(Sqrt[3]*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*
Sqrt[n])] + 6*E^((3*a)/(b*n))*(c*x^n)^(3/n)*(4*d^3 + 6*d^2*e*x + 4*d*e^2*x
^2 + e^3*x^3)*Sqrt[a + b*Log[c*x^n]])))/(48*E^((4*a)/(b*n))*(c*x^n)^(4/n))
```

3.126.3 Rubi [A] (verified)

Time = 0.89 (sec) , antiderivative size = 402, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx$$
$$\Big\downarrow \text{2767}$$
$$\int \left(d^3\sqrt{a+b\log(cx^n)}+3d^2ex\sqrt{a+b\log(cx^n)}+3de^2x^2\sqrt{a+b\log(cx^n)}+e^3x^3\sqrt{a+b\log(cx^n)}\right)dx$$
$$\Big\downarrow \text{2009}$$

$$-\frac{1}{2}\sqrt{\pi}\sqrt{b}d^3\sqrt{n}xe^{-\frac{a}{bn}}(cx^n)^{-1/n}\,\mathrm{erfi}\left(\frac{\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+d^3x\sqrt{a+b\log(cx^n)}-\frac{3}{4}\sqrt{\frac{\pi}{2}}\sqrt{b}d^2e\sqrt{n}x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\,\mathrm{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+\frac{3}{2}d^2ex^2\sqrt{a+b\log(cx^n)}-\frac{1}{2}\sqrt{\frac{\pi}{3}}\sqrt{b}de^2\sqrt{n}x^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\,\mathrm{erfi}\left(\frac{\sqrt{3}\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+de^2x^3\sqrt{a+b\log(cx^n)}-\frac{1}{16}\sqrt{\pi}\sqrt{b}e^3\sqrt{n}x^4e^{-\frac{4a}{bn}}(cx^n)^{-4/n}\,\mathrm{erfi}\left(\frac{2\sqrt{a+b\log(cx^n)}}{\sqrt{b}\sqrt{n}}\right)+\frac{1}{4}e^3x^4\sqrt{a+b\log(cx^n)}$$

input
```
Int[(d + e*x)^3*Sqrt[a + b*Log[c*x^n]],x]
```

output
```
-1/2*(Sqrt[b]*d^3*Sqrt[n]*Sqrt[Pi]*x*Erfi[Sqrt[a + b*Log[c*x^n]]/(Sqrt[b]*
Sqrt[n])])/(E^(a/(b*n))*(c*x^n)^n^(-1)) - (Sqrt[b]*e^3*Sqrt[n]*Sqrt[Pi]*x^
4*Erfi[(2*Sqrt[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(16*E^((4*a)/(b*n))*
(c*x^n)^(4/n)) - (3*Sqrt[b]*d^2*e*Sqrt[n]*Sqrt[Pi/2]*x^2*Erfi[(Sqrt[2]*Sqr
t[a + b*Log[c*x^n]])/(Sqrt[b]*Sqrt[n])])/(4*E^((2*a)/(b*n))*(c*x^n)^(2/n))
 - (Sqrt[b]*d*e^2*Sqrt[n]*Sqrt[Pi/3]*x^3*Erfi[(Sqrt[3]*Sqrt[a + b*Log[c*x^
n]])/(Sqrt[b]*Sqrt[n])])/(2*E^((3*a)/(b*n))*(c*x^n)^(3/n)) + d^3*x*Sqrt[a
+ b*Log[c*x^n]] + (3*d^2*e*x^2*Sqrt[a + b*Log[c*x^n]])/2 + d*e^2*x^3*Sqrt[
a + b*Log[c*x^n]] + (e^3*x^4*Sqrt[a + b*Log[c*x^n]])/4
```

3.126.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

3.126.4 Maple [F]

$$\int (ex+d)^3 \sqrt{a+b\ln(c\,x^n)}dx$$

input
```
int((e*x+d)^3*(a+b*ln(c*x^n))^(1/2),x)
```

output
```
int((e*x+d)^3*(a+b*ln(c*x^n))^(1/2),x)
```

3.126.5 Fricas [F(-2)]

Exception generated.

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

3.126.6 Sympy [F]

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx = \int \sqrt{a+b\log(cx^n)}(d+ex)^3\,dx$$

input
```
integrate((e*x+d)**3*(a+b*ln(c*x**n))**(1/2),x)
```

output
```
Integral(sqrt(a + b*log(c*x**n))*(d + e*x)**3, x)
```

3.126.7 Maxima [F]

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx=\int (ex+d)^3\sqrt{b\log(cx^n)+a}\,dx$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))^(1/2),x, algorithm="maxima")
```

output
```
integrate((e*x + d)^3*sqrt(b*log(c*x^n) + a), x)
```

3.126.8 Giac [F]

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx=\int (ex+d)^3\sqrt{b\log(cx^n)+a}\,dx$$

input
```
integrate((e*x+d)^3*(a+b*log(c*x^n))^(1/2),x, algorithm="giac")
```

output
```
integrate((e*x + d)^3*sqrt(b*log(c*x^n) + a), x)
```

3.126.9 Mupad [F(-1)]

Timed out.

$$\int (d+ex)^3\sqrt{a+b\log(cx^n)}\,dx=\int \sqrt{a+b\,\ln(c\,x^n)}\,(d+e\,x)^3\,dx$$

input
```
int((a + b*log(c*x^n))^(1/2)*(d + e*x)^3,x)
```

output
```
int((a + b*log(c*x^n))^(1/2)*(d + e*x)^3, x)
```

3.127 $\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx$

3.127.1 Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx = \text{Int}\left(\frac{\sqrt{a+b\log(cx^n)}}{d+ex},x\right)$$

output
```
Unintegrable((a+b*ln(c*x^n))^(1/2)/(e*x+d),x)
```

3.127.2 Mathematica [N/A]

Not integrable

Time = 7.97 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx = \int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx$$

input
```
Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x),x]
```

output
```
Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x), x]
```

3.127.3 Rubi [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx$$

$$\Big\downarrow \text{2768}$$

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}dx$$

input
```
Int[Sqrt[a + b*Log[c*x^n]]/(d + e*x),x]
```

output
```
$Aborted
```

3.127.3.1 Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

3.127.4 Maple [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{a+b\ln(c\,x^n)}}{ex+d}dx$$

input
```
int((a+b*ln(c*x^n))^(1/2)/(e*x+d),x)
```

output
```
int((a+b*ln(c*x^n))^(1/2)/(e*x+d),x)
```

3.127.5 Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{a+b\log\left(cx^n\right)}}{d+ex}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

3.127.6 Sympy [N/A]

Not integrable

Time = 0.37 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.86

$$\int \frac{\sqrt{a+b\log\left(cx^n\right)}}{d+ex}\,dx = \int \frac{\sqrt{a+b\log\left(cx^n\right)}}{d+ex}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**(1/2)/(e*x+d),x)
```

output
```
Integral(sqrt(a + b*log(c*x**n))/(d + e*x), x)
```

3.127.7 Maxima [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log\left(cx^n\right)}}{d+ex}\,dx = \int \frac{\sqrt{b\log\left(cx^n\right)+a}}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d),x, algorithm="maxima")
```

output
```
integrate(sqrt(b*log(c*x^n) + a)/(e*x + d), x)
```

3.127.8 Giac [N/A]

Not integrable

Time = 0.43 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx = \int \frac{\sqrt{b\log(cx^n)+a}}{ex+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d),x, algorithm="giac")
```

output
```
integrate(sqrt(b*log(c*x^n) + a)/(e*x + d), x)
```

3.127.9 Mupad [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{d+ex}\,dx = \int \frac{\sqrt{a+b\,\ln\left(c\,x^n\right)}}{d+e\,x}\,dx$$

input
```
int((a + b*log(c*x^n))^(1/2)/(d + e*x),x)
```

output
```
int((a + b*log(c*x^n))^(1/2)/(d + e*x), x)
```

3.128 $\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx$

3.128.1 Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx = \frac{x\sqrt{a+b\log(cx^n)}}{d(d+ex)} - \frac{bn\text{Int}\left(\frac{1}{(d+ex)\sqrt{a+b\log(cx^n)}},x\right)}{2d}$$

output
```
x*(a+b*ln(c*x^n))^(1/2)/d/(e*x+d)-1/2*b*n*Unintegrable(1/(e*x+d)/(a+b*ln(c
*x^n))^(1/2),x)/d
```

3.128.2 Mathematica [N/A]

Not integrable

Time = 5.64 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx = \int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx$$

input
```
Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^2,x]
```

output
```
Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^2, x]
```

3.128.3 Rubi [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2755, 2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}dx$$

$$\Big\downarrow \ 2755$$

$$\frac{x\sqrt{a+b\log(cx^n)}}{d(d+ex)}-\frac{bn\int \frac{1}{(d+ex)\sqrt{a+b\log(cx^n)}}dx}{2d}$$

$$\Big\downarrow \ 2768$$

$$\frac{x\sqrt{a+b\log(cx^n)}}{d(d+ex)}-\frac{bn\int \frac{1}{(d+ex)\sqrt{a+b\log(cx^n)}}dx}{2d}$$

input
```
Int[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^2,x]
```

output
```
$Aborted
```

3.128.3.1 Defintions of rubi rules used

rule 2755
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_))^2, x_Sy
mbol] :> Simp[x*((a + b*Log[c*x^n])^p/(d*(d + e*x))), x] - Simp[b*n*(p/d)
 Int[(a + b*Log[c*x^n])^(p - 1)/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e,
n, p}, x] && GtQ[p, 0]
```

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

3.128.4 Maple [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{a+b\ln \left(c\,x^{n}\right)}}{\left(ex+d\right)^{2}}dx$$

input
```
int((a+b*ln(c*x^n))^(1/2)/(e*x+d)^2,x)
```

output
```
int((a+b*ln(c*x^n))^(1/2)/(e*x+d)^2,x)
```

3.128.5 Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{(d+ex)^{2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^2,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

3.128.6 Sympy [N/A]

Not integrable

Time = 0.84 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{(d+ex)^{2}}\,dx = \int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{\left(d+ex\right)^{2}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**(1/2)/(e*x+d)**2,x)
```

output
```
Integral(sqrt(a + b*log(c*x**n))/(d + e*x)**2, x)
```

3.128.7 Maxima [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx=\int \frac{\sqrt{b\log(cx^n)+a}}{(ex+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^2,x, algorithm="maxima")
```

output
```
integrate(sqrt(b*log(c*x^n) + a)/(e*x + d)^2, x)
```

3.128.8 Giac [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx=\int \frac{\sqrt{b\log(cx^n)+a}}{(ex+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate(sqrt(b*log(c*x^n) + a)/(e*x + d)^2, x)
```

3.128.9 Mupad [N/A]

Not integrable

Time = 0.39 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^2}\,dx=\int \frac{\sqrt{a+b\,\ln(c\,x^n)}}{(d+e\,x)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^(1/2)/(d + e*x)^2,x)
```

output
```
int((a + b*log(c*x^n))^(1/2)/(d + e*x)^2, x)
```

3.129 $\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx$

3.129.1 Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx = -\frac{\sqrt{a+b\log(cx^n)}}{2e(d+ex)^2}+\frac{bn\text{Int}\left(\frac{1}{x(d+ex)^2\sqrt{a+b\log(cx^n)}},x\right)}{4e}$$

output
```
-1/2*(a+b*ln(c*x^n))^(1/2)/e/(e*x+d)^2+1/4*b*n*Unintegrable(1/x/(e*x+d)^2/
(a+b*ln(c*x^n))^(1/2),x)/e
```

3.129.2 Mathematica [N/A]

Not integrable

Time = 13.81 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx = \int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx$$

input
```
Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^3,x]
```

output
```
Integrate[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^3, x]
```

3.129.3 Rubi [N/A]

Not integrable

Time = 0.37 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2756, 2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx$$

$$\Big\downarrow \ 2756$$

$$\frac{bn\int \frac{1}{x(d+ex)^2\sqrt{a+b\log(cx^n)}}dx}{4e}-\frac{\sqrt{a+b\log(cx^n)}}{2e(d+ex)^2}$$

$$\Big\downarrow \ 2796$$

$$\frac{bn\int \frac{1}{x(d+ex)^2\sqrt{a+b\log(cx^n)}}dx}{4e}-\frac{\sqrt{a+b\log(cx^n)}}{2e(d+ex)^2}$$

input
```
Int[Sqrt[a + b*Log[c*x^n]]/(d + e*x)^3,x]
```

output
```
$Aborted
```

3.129.3.1 Defintions of rubi rules used

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.129.4 Maple [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{a+b\ln\left(c\,x^{n}\right)}}{\left(ex+d\right)^{3}}dx$$

input
```
int((a+b*ln(c*x^n))^(1/2)/(e*x+d)^3,x)
```

output
```
int((a+b*ln(c*x^n))^(1/2)/(e*x+d)^3,x)
```

3.129.5 Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{(d+ex)^{3}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^3,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

3.129.6 Sympy [N/A]

Not integrable

Time = 1.73 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{(d+ex)^{3}}\,dx = \int \frac{\sqrt{a+b\log\left(cx^{n}\right)}}{\left(d+ex\right)^{3}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**(1/2)/(e*x+d)**3,x)
```

output
```
Integral(sqrt(a + b*log(c*x**n))/(d + e*x)**3, x)
```

3.129.7 Maxima [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx = \int \frac{\sqrt{b\log(cx^n)+a}}{(ex+d)^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^3,x, algorithm="maxima")
```

output
```
integrate(sqrt(b*log(c*x^n) + a)/(e*x + d)^3, x)
```

3.129.8 Giac [N/A]

Not integrable

Time = 0.38 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx = \int \frac{\sqrt{b\log(cx^n)+a}}{(ex+d)^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))^(1/2)/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate(sqrt(b*log(c*x^n) + a)/(e*x + d)^3, x)
```

3.129.9 Mupad [N/A]

Not integrable

Time = 0.39 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{\sqrt{a+b\log(cx^n)}}{(d+ex)^3}\,dx = \int \frac{\sqrt{a+b\,\ln(c\,x^n)}}{(d+e\,x)^3}\,dx$$

input
```
int((a + b*log(c*x^n))^(1/2)/(d + e*x)^3,x)
```

output
```
int((a + b*log(c*x^n))^(1/2)/(d + e*x)^3, x)
```

3.130 $\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx$

3.130.1 Optimal result

Integrand size = 23, antiderivative size = 242

$$\begin{aligned}\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx &= \frac{64bd^4n\sqrt{d+ex}}{315e^4}+\frac{64bd^3n(d+ex)^{3/2}}{945e^4}\\&-\frac{356bd^2n(d+ex)^{5/2}}{1575e^4}+\frac{80bdn(d+ex)^{7/2}}{441e^4}\\&-\frac{4bn(d+ex)^{9/2}}{81e^4}-\frac{64bd^{9/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{315e^4}\\&-\frac{2d^3(d+ex)^{3/2}(a+b\log(cx^n))}{3e^4}\\&+\frac{6d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}\\&-\frac{6d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}\\&+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^4}\end{aligned}$$

output
```
64/945*b*d^3*n*(e*x+d)^(3/2)/e^4-356/1575*b*d^2*n*(e*x+d)^(5/2)/e^4+80/441
*b*d*n*(e*x+d)^(7/2)/e^4-4/81*b*n*(e*x+d)^(9/2)/e^4-64/315*b*d^(9/2)*n*arc
tanh((e*x+d)^(1/2)/d^(1/2))/e^4-2/3*d^3*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^4+
6/5*d^2*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^4-6/7*d*(e*x+d)^(7/2)*(a+b*ln(c*x^
n))/e^4+2/9*(e*x+d)^(9/2)*(a+b*ln(c*x^n))/e^4+64/315*b*d^4*n*(e*x+d)^(1/2)
/e^4
```

3.130.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 183, normalized size of antiderivative = 0.76

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx =$$

$$-\frac{2\left(10080bd^{9/2}n\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}(315a(16d^4-8d^3ex+6d^2e^2x^2-5de^3x^3-35e^4x^4)+2bn(-\right.}{}$$

input
```
Integrate[x^3*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(-2*(10080*b*d^(9/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(315
*a*(16*d^4 - 8*d^3*e*x + 6*d^2*e^2*x^2 - 5*d*e^3*x^3 - 35*e^4*x^4) + 2*b*n
*(-4388*d^4 + 934*d^3*e*x - 543*d^2*e^2*x^2 + 400*d*e^3*x^3 + 1225*e^4*x^4
) + 315*b*(16*d^4 - 8*d^3*e*x + 6*d^2*e^2*x^2 - 5*d*e^3*x^3 - 35*e^4*x^4)*
Log[c*x^n]))/(99225*e^4)
```

3.130.3 Rubi [A] (verified)

Time = 0.50 (sec) , antiderivative size = 218, normalized size of antiderivative = 0.90, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2792, 27, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{2(d+ex)^{3/2}\left(16d^3-24exd^2+30e^2x^2d-35e^3x^3\right)}{315e^4x}dx-\frac{2d^3(d+ex)^{3/2}(a+b\log(cx^n))}{3e^4}+\frac{6d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^4}-\frac{6d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}$$

$$\Big\downarrow \text{27}$$

$$\frac{2bn\int\frac{(d+ex)^{3/2}\left(16d^3-24exd^2+30e^2x^2d-35e^3x^3\right)}{x}dx}{315e^4}-\frac{2d^3(d+ex)^{3/2}(a+b\log(cx^n))}{3e^4}+\frac{6d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^4}-\frac{6d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}$$

$$\Big\downarrow \text{2123}$$

$$\frac{2bn\int\left(-35e(d+ex)^{7/2}+100de(d+ex)^{5/2}-89d^2e(d+ex)^{3/2}+\frac{16d^3(d+ex)^{3/2}}{x}\right)dx}{315e^4}-\frac{2d^3(d+ex)^{3/2}(a+b\log(cx^n))}{3e^4}+\frac{6d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^4}-\frac{6d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}$$

$$\Big\downarrow \textcolor{blue}{2009}$$

$$-\frac{2d^3(d+ex)^{3/2}(a+b\log(cx^n))}{3e^4}+\frac{6d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^4}-\frac{6d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}+\frac{2bn\left(-32d^{9/2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+32d^4\sqrt{d+ex}+\frac{32}{3}d^3(d+ex)^{3/2}-\frac{178}{5}d^2(d+ex)^{5/2}+\frac{200}{7}d(d+ex)^{7/2}-\frac{70}{9}(d+\right.}{315e^4}$$

input
```
Int[x^3*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(2*b*n*(32*d^4*Sqrt[d + e*x] + (32*d^3*(d + e*x)^(3/2))/3 - (178*d^2*(d +
e*x)^(5/2))/5 + (200*d*(d + e*x)^(7/2))/7 - (70*(d + e*x)^(9/2))/9 - 32*d^
(9/2)*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/(315*e^4) - (2*d^3*(d + e*x)^(3/2)*
(a + b*Log[c*x^n]))/(3*e^4) + (6*d^2*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(
5*e^4) - (6*d*(d + e*x)^(7/2)*(a + b*Log[c*x^n]))/(7*e^4) + (2*(d + e*x)^(
9/2)*(a + b*Log[c*x^n]))/(9*e^4)
```

3.130.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.130.4 Maple [F]

$$\int x^3(a+b\ln(c\,x^n))\sqrt{ex+d}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

3.130.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 495, normalized size of antiderivative = 2.05

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$= \left[\frac{2\left(5040\,bd^{\frac{9}{2}}n\log\left(\frac{ex-2\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(8776\,bd^4n-5040\,ad^4-1225\,(2\,be^4n-9\,ae^4)x^4-25\,(32\,bde^3n-\right.}{}\right.$$

input
```
integrate(x^3*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
[2/99225*(5040*b*d^(9/2)*n*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) +
(8776*b*d^4*n - 5040*a*d^4 - 1225*(2*b*e^4*n - 9*a*e^4)*x^4 - 25*(32*b*d*e
^3*n - 63*a*d*e^3)*x^3 + 6*(181*b*d^2*e^2*n - 315*a*d^2*e^2)*x^2 - 4*(467*
b*d^3*e*n - 630*a*d^3*e)*x + 315*(35*b*e^4*x^4 + 5*b*d*e^3*x^3 - 6*b*d^2*e
^2*x^2 + 8*b*d^3*e*x - 16*b*d^4)*log(c) + 315*(35*b*e^4*n*x^4 + 5*b*d*e^3*
n*x^3 - 6*b*d^2*e^2*n*x^2 + 8*b*d^3*e*n*x - 16*b*d^4*n)*log(x))*sqrt(e*x +
 d))/e^4, 2/99225*(10080*b*sqrt(-d)*d^4*n*arctan(sqrt(e*x + d)*sqrt(-d)/d)
 + (8776*b*d^4*n - 5040*a*d^4 - 1225*(2*b*e^4*n - 9*a*e^4)*x^4 - 25*(32*b*
d*e^3*n - 63*a*d*e^3)*x^3 + 6*(181*b*d^2*e^2*n - 315*a*d^2*e^2)*x^2 - 4*(4
67*b*d^3*e*n - 630*a*d^3*e)*x + 315*(35*b*e^4*x^4 + 5*b*d*e^3*x^3 - 6*b*d^
2*e^2*x^2 + 8*b*d^3*e*x - 16*b*d^4)*log(c) + 315*(35*b*e^4*n*x^4 + 5*b*d*e
^3*n*x^3 - 6*b*d^2*e^2*n*x^2 + 8*b*d^3*e*n*x - 16*b*d^4*n)*log(x))*sqrt(e*
x + d))/e^4]
```

3.130.6 Sympy [A] (verification not implemented)

Time = 70.60 (sec) , antiderivative size = 347, normalized size of antiderivative = 1.43

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx$$

$$= a\left(\begin{cases}-\frac{2d^3(d+ex)^{\frac{3}{2}}}{3e^4}+\frac{6d^2(d+ex)^{\frac{5}{2}}}{5e^4}-\frac{6d(d+ex)^{\frac{7}{2}}}{7e^4}+\frac{2(d+ex)^{\frac{9}{2}}}{9e^4} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^4}{4} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases}-\frac{17552d^{\frac{9}{2}}\sqrt{1+\frac{ex}{d}}}{99225e^4}-\frac{32d^{\frac{9}{2}}\log\left(\frac{ex}{d}\right)}{315e^4}+\frac{64d^{\frac{9}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{315e^4}+\frac{3736d^{\frac{7}{2}}x\sqrt{1+\frac{ex}{d}}}{99225e^3}-\frac{724d^{\frac{5}{2}}x^2\sqrt{1+\frac{ex}{d}}}{33075e^2}+\frac{64d^{\frac{3}{2}}x^3\sqrt{1+\frac{ex}{d}}}{3969e}\\ \frac{\sqrt{d}x^4}{16}\end{cases}\right.$$
$$+b\left(\begin{cases}-\frac{2d^3(d+ex)^{\frac{3}{2}}}{3e^4}+\frac{6d^2(d+ex)^{\frac{5}{2}}}{5e^4}-\frac{6d(d+ex)^{\frac{7}{2}}}{7e^4}+\frac{2(d+ex)^{\frac{9}{2}}}{9e^4} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^4}{4} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(a+b*ln(c*x**n))*(e*x+d)**(1/2),x)
```

output
```
a*Piecewise((-2*d**3*(d + e*x)**(3/2)/(3*e**4) + 6*d**2*(d + e*x)**(5/2)/(
5*e**4) - 6*d*(d + e*x)**(7/2)/(7*e**4) + 2*(d + e*x)**(9/2)/(9*e**4), Ne(
e, 0)), (sqrt(d)*x**4/4, True)) - b*n*Piecewise((-17552*d**(9/2)*sqrt(1 +
e*x/d)/(99225*e**4) - 32*d**(9/2)*log(e*x/d)/(315*e**4) + 64*d**(9/2)*log(
sqrt(1 + e*x/d) + 1)/(315*e**4) + 3736*d**(7/2)*x*sqrt(1 + e*x/d)/(99225*e
**3) - 724*d**(5/2)*x**2*sqrt(1 + e*x/d)/(33075*e**2) + 64*d**(3/2)*x**3*s
qrt(1 + e*x/d)/(3969*e) + 4*sqrt(d)*x**4*sqrt(1 + e*x/d)/81, (e > -oo) & (
e < oo) & Ne(e, 0)), (sqrt(d)*x**4/16, True)) + b*Piecewise((-2*d**3*(d +
e*x)**(3/2)/(3*e**4) + 6*d**2*(d + e*x)**(5/2)/(5*e**4) - 6*d*(d + e*x)**(
7/2)/(7*e**4) + 2*(d + e*x)**(9/2)/(9*e**4), Ne(e, 0)), (sqrt(d)*x**4/4, T
rue))*log(c*x**n)
```

3.130.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 227, normalized size of antiderivative = 0.94

$$\int x^3\sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$=\frac{4}{99225}\left(\frac{2520\,d^{\frac{9}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^4}-\frac{1225\,(ex+d)^{\frac{9}{2}}-4500\,(ex+d)^{\frac{7}{2}}d+5607\,(ex+d)^{\frac{5}{2}}d^2-1680\,(ex+d}{e^4}\right.$$
$$+\frac{2}{315}b\left(\frac{35\,(ex+d)^{\frac{9}{2}}}{e^4}-\frac{135\,(ex+d)^{\frac{7}{2}}d}{e^4}+\frac{189\,(ex+d)^{\frac{5}{2}}d^2}{e^4}-\frac{105\,(ex+d)^{\frac{3}{2}}d^3}{e^4}\right)\log(cx^n)$$
$$+\frac{2}{315}a\left(\frac{35\,(ex+d)^{\frac{9}{2}}}{e^4}-\frac{135\,(ex+d)^{\frac{7}{2}}d}{e^4}+\frac{189\,(ex+d)^{\frac{5}{2}}d^2}{e^4}-\frac{105\,(ex+d)^{\frac{3}{2}}d^3}{e^4}\right)$$

input
```
integrate(x^3*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
4/99225*(2520*d^(9/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(
d)))/e^4 - (1225*(e*x + d)^(9/2) - 4500*(e*x + d)^(7/2)*d + 5607*(e*x + d)
^(5/2)*d^2 - 1680*(e*x + d)^(3/2)*d^3 - 5040*sqrt(e*x + d)*d^4)/e^4)*b*n +
 2/315*b*(35*(e*x + d)^(9/2)/e^4 - 135*(e*x + d)^(7/2)*d/e^4 + 189*(e*x +
d)^(5/2)*d^2/e^4 - 105*(e*x + d)^(3/2)*d^3/e^4)*log(c*x^n) + 2/315*a*(35*(
e*x + d)^(9/2)/e^4 - 135*(e*x + d)^(7/2)*d/e^4 + 189*(e*x + d)^(5/2)*d^2/e
^4 - 105*(e*x + d)^(3/2)*d^3/e^4)
```

3.130.8 Giac [F]

$$\int x^3\sqrt{d+ex}(a+b\log{(cx^n)})\,dx = \int \sqrt{ex+d}(b\log{(cx^n)}+a)x^3\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a)*x^3, x)
```

3.130.9 Mupad [F(-1)]

Timed out.

$$\int x^3\sqrt{d+ex}(a+b\log{(cx^n)})\,dx = \int x^3\,\left(a+b\,\ln{\left(c\,x^n\right)}\right)\,\sqrt{d+e\,x}\,dx$$

input
```
int(x^3*(a + b*log(c*x^n))*(d + e*x)^(1/2),x)
```

output
```
int(x^3*(a + b*log(c*x^n))*(d + e*x)^(1/2), x)
```

3.131 $\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx$

3.131.1 Optimal result

Integrand size = 23, antiderivative size = 192

$$\begin{aligned}\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx =& -\frac{32bd^3n\sqrt{d+ex}}{105e^3}-\frac{32bd^2n(d+ex)^{3/2}}{315e^3}\\&+\frac{36bdn(d+ex)^{5/2}}{175e^3}-\frac{4bn(d+ex)^{7/2}}{49e^3}\\&+\frac{32bd^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{105e^3}\\&+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}\\&-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}\\&+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}\end{aligned}$$

output
```
-32/315*b*d^2*n*(e*x+d)^(3/2)/e^3+36/175*b*d*n*(e*x+d)^(5/2)/e^3-4/49*b*n*
(e*x+d)^(7/2)/e^3+32/105*b*d^(7/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^3+2/
3*d^2*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^3-4/5*d*(e*x+d)^(5/2)*(a+b*ln(c*x^n)
)/e^3+2/7*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e^3-32/105*b*d^3*n*(e*x+d)^(1/2)/e
^3
```

3.131.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 151, normalized size of antiderivative = 0.79

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$=\frac{3360bd^{7/2}n\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2\sqrt{d+ex}(105a(8d^3-4d^2ex+3de^2x^2+15e^3x^3)-2bn(778d^3-179d^2ex+\cdots}{11025e^3}$$

input
```
Integrate[x^2*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(3360*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(105*a*
(8*d^3 - 4*d^2*e*x + 3*d*e^2*x^2 + 15*e^3*x^3) - 2*b*n*(778*d^3 - 179*d^2*
e*x + 108*d*e^2*x^2 + 225*e^3*x^3) + 105*b*(8*d^3 - 4*d^2*e*x + 3*d*e^2*x^
2 + 15*e^3*x^3)*Log[c*x^n]))/(11025*e^3)
```

3.131.3 Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 188, normalized size of antiderivative = 0.98, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.261, Rules used = {2792, 27, 1192, 25, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$\Big\downarrow \ 2792$$
$$-bn\int\frac{2(d+ex)^{3/2}(8d^2-12exd+15e^2x^2)}{105e^3x}dx+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}$$
$$\Big\downarrow \ 27$$
$$-\frac{2bn\int\frac{(d+ex)^{3/2}(8d^2-12exd+15e^2x^2)}{x}dx}{105e^3}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}$$
$$\Big\downarrow \ 1192$$

$$-\frac{4bn\int\frac{(d+ex)^2(35d^2e^2+15(d+ex)^2e^2-42d(d+ex)e^2)}{ex}d\sqrt{d+ex}}{105e^5}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \text{25}$$

$$\frac{4bn\int-\frac{(d+ex)^2(35d^2e^2+15(d+ex)^2e^2-42d(d+ex)e^2)}{ex}d\sqrt{d+ex}}{105e^5}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \text{1584}$$

$$\frac{4bn\int\left(-\frac{8ed^4}{x}-8e^2d^3-8e^2(d+ex)d^2+27e^2(d+ex)^2d-15e^2(d+ex)^3\right)d\sqrt{d+ex}}{105e^5}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4bn\left(-8d^{7/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+8d^3e^2\sqrt{d+ex}+\frac{8}{3}d^2e^2(d+ex)^{3/2}-\frac{27}{5}de^2(d+ex)^{5/2}+\frac{15}{7}e^2(d+ex)^{7/2}\right)}{105e^5}$$

input
```
Int[x^2*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(-4*b*n*(8*d^3*e^2*Sqrt[d + e*x] + (8*d^2*e^2*(d + e*x)^(3/2))/3 - (27*d*e
^2*(d + e*x)^(5/2))/5 + (15*e^2*(d + e*x)^(7/2))/7 - 8*d^(7/2)*e^2*ArcTanh
[Sqrt[d + e*x]/Sqrt[d]]))/(105*e^5) + (2*d^2*(d + e*x)^(3/2)*(a + b*Log[c*
x^n]))/(3*e^3) - (4*d*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^3) + (2*(d
+ e*x)^(7/2)*(a + b*Log[c*x^n]))/(7*e^3)
```

3.131.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.131.4 Maple [F]

$$\int x^2(a+b\ln(c\,x^n))\,\sqrt{ex+d}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

3.131.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 396, normalized size of antiderivative = 2.06

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$= \left[\frac{2\left(840\,bd^{\frac{7}{2}}n\log\left(\frac{ex+2\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right) - (1556\,bd^3n - 840\,ad^3 + 225\,(2\,be^3n - 7\,ae^3)x^3 + 9\,(24\,bde^2n - 35\,a\right.}{}\right.$$
$$-\frac{2\left(1680\,b\sqrt{-d}d^3n\arctan\left(\frac{\sqrt{ex+d}\sqrt{-d}}{d}\right) + (1556\,bd^3n - 840\,ad^3 + 225\,(2\,be^3n - 7\,ae^3)x^3 + 9\,(24\,bde^2n - \right.}{}$$

input
```
integrate(x^2*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
[2/11025*(840*b*d^(7/2)*n*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) - (
1556*b*d^3*n - 840*a*d^3 + 225*(2*b*e^3*n - 7*a*e^3)*x^3 + 9*(24*b*d*e^2*n
 - 35*a*d*e^2)*x^2 - 2*(179*b*d^2*e*n - 210*a*d^2*e)*x - 105*(15*b*e^3*x^3
 + 3*b*d*e^2*x^2 - 4*b*d^2*e*x + 8*b*d^3)*log(c) - 105*(15*b*e^3*n*x^3 + 3
*b*d*e^2*n*x^2 - 4*b*d^2*e*n*x + 8*b*d^3*n)*log(x))*sqrt(e*x + d))/e^3, -2
/11025*(1680*b*sqrt(-d)*d^3*n*arctan(sqrt(e*x + d)*sqrt(-d)/d) + (1556*b*d
^3*n - 840*a*d^3 + 225*(2*b*e^3*n - 7*a*e^3)*x^3 + 9*(24*b*d*e^2*n - 35*a*
d*e^2)*x^2 - 2*(179*b*d^2*e*n - 210*a*d^2*e)*x - 105*(15*b*e^3*x^3 + 3*b*d
*e^2*x^2 - 4*b*d^2*e*x + 8*b*d^3)*log(c) - 105*(15*b*e^3*n*x^3 + 3*b*d*e^2
*n*x^2 - 4*b*d^2*e*n*x + 8*b*d^3*n)*log(x))*sqrt(e*x + d))/e^3]
```

3.131.6 Sympy [A] (verification not implemented)

Time = 51.04 (sec) , antiderivative size = 284, normalized size of antiderivative = 1.48

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx = a\left(\begin{cases}\frac{2d^2(d+ex)^{\frac{3}{2}}}{3e^3} - \frac{4d(d+ex)^{\frac{5}{2}}}{5e^3} + \frac{2(d+ex)^{\frac{7}{2}}}{7e^3} & \text{for } e \neq 0 \\ \frac{\sqrt{d}x^3}{3} & \text{otherwise}\end{cases}\right)$$
$$- bn\left(\begin{cases}\frac{3112d^{\frac{7}{2}}\sqrt{1+\frac{ex}{d}}}{11025e^3} + \frac{16d^{\frac{7}{2}}\log\left(\frac{ex}{d}\right)}{105e^3} - \frac{32d^{\frac{7}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{105e^3} - \frac{716d^{\frac{5}{2}}x\sqrt{1+\frac{ex}{d}}}{11025e^2} + \frac{48d^{\frac{3}{2}}x^2\sqrt{1+\frac{ex}{d}}}{1225e} + \frac{4\sqrt{d}x^3\sqrt{1+\frac{ex}{d}}}{49} & \text{for } e \\ \frac{\sqrt{d}x^3}{9} & \text{othe}\end{cases}\right.$$
$$+ b\left(\begin{cases}\frac{2d^2(d+ex)^{\frac{3}{2}}}{3e^3} - \frac{4d(d+ex)^{\frac{5}{2}}}{5e^3} + \frac{2(d+ex)^{\frac{7}{2}}}{7e^3} & \text{for } e \neq 0 \\ \frac{\sqrt{d}x^3}{3} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**2*(a+b*ln(c*x**n))*(e*x+d)**(1/2),x)
```

output
```
a*Piecewise((2*d**2*(d + e*x)**(3/2)/(3*e**3) - 4*d*(d + e*x)**(5/2)/(5*e*
*3) + 2*(d + e*x)**(7/2)/(7*e**3), Ne(e, 0)), (sqrt(d)*x**3/3, True)) - b*
n*Piecewise((3112*d**(7/2)*sqrt(1 + e*x/d)/(11025*e**3) + 16*d**(7/2)*log(
e*x/d)/(105*e**3) - 32*d**(7/2)*log(sqrt(1 + e*x/d) + 1)/(105*e**3) - 716*
d**(5/2)*x*sqrt(1 + e*x/d)/(11025*e**2) + 48*d**(3/2)*x**2*sqrt(1 + e*x/d)
/(1225*e) + 4*sqrt(d)*x**3*sqrt(1 + e*x/d)/49, (e > -oo) & (e < oo) & Ne(e
, 0)), (sqrt(d)*x**3/9, True)) + b*Piecewise((2*d**2*(d + e*x)**(3/2)/(3*e
**3) - 4*d*(d + e*x)**(5/2)/(5*e**3) + 2*(d + e*x)**(7/2)/(7*e**3), Ne(e,
0)), (sqrt(d)*x**3/3, True))*log(c*x**n)
```

3.131.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 184, normalized size of antiderivative = 0.96

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx =$$

$$-\frac{4}{11025}\left(\frac{420\,d^{\frac{7}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^3}+\frac{225\,(ex+d)^{\frac{7}{2}}-567\,(ex+d)^{\frac{5}{2}}d+280\,(ex+d)^{\frac{3}{2}}d^2+840\,\sqrt{ex+d}d^3}{e^3}\right.$$

$$+\frac{2}{105}\,b\left(\frac{15\,(ex+d)^{\frac{7}{2}}}{e^3}-\frac{42\,(ex+d)^{\frac{5}{2}}d}{e^3}+\frac{35\,(ex+d)^{\frac{3}{2}}d^2}{e^3}\right)\log(cx^n)$$

$$+\frac{2}{105}\,a\left(\frac{15\,(ex+d)^{\frac{7}{2}}}{e^3}-\frac{42\,(ex+d)^{\frac{5}{2}}d}{e^3}+\frac{35\,(ex+d)^{\frac{3}{2}}d^2}{e^3}\right)$$

input
```
integrate(x^2*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
-4/11025*(420*d^(7/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(
d)))/e^3 + (225*(e*x + d)^(7/2) - 567*(e*x + d)^(5/2)*d + 280*(e*x + d)^(3
/2)*d^2 + 840*sqrt(e*x + d)*d^3)/e^3)*b*n + 2/105*b*(15*(e*x + d)^(7/2)/e^
3 - 42*(e*x + d)^(5/2)*d/e^3 + 35*(e*x + d)^(3/2)*d^2/e^3)*log(c*x^n) + 2/
105*a*(15*(e*x + d)^(7/2)/e^3 - 42*(e*x + d)^(5/2)*d/e^3 + 35*(e*x + d)^(3
/2)*d^2/e^3)
```

3.131.8 Giac [F]

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx = \int \sqrt{ex+d}(b\log(cx^n)+a)x^2\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a)*x^2, x)
```

3.131.9 Mupad [F(-1)]

Timed out.

$$\int x^2\sqrt{d+ex}(a+b\log(cx^n))\,dx = \int x^2\,(a+b\,\ln(c\,x^n))\,\sqrt{d+e\,x}\,dx$$

input
```
int(x^2*(a + b*log(c*x^n))*(d + e*x)^(1/2),x)
```

output
```
int(x^2*(a + b*log(c*x^n))*(d + e*x)^(1/2), x)
```

3.132 $\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx$

3.132.1 Optimal result

Integrand size = 21, antiderivative size = 142

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx = \frac{8bd^2n\sqrt{d+ex}}{15e^2}+\frac{8bdn(d+ex)^{3/2}}{45e^2} -\frac{4bn(d+ex)^{5/2}}{25e^2}-\frac{8bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{15e^2} -\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2} +\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}$$

output
```
8/45*b*d*n*(e*x+d)^(3/2)/e^2-4/25*b*n*(e*x+d)^(5/2)/e^2-8/15*b*d^(5/2)*n*a
rctanh((e*x+d)^(1/2)/d^(1/2))/e^2-2/3*d*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^2+
2/5*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^2+8/15*b*d^2*n*(e*x+d)^(1/2)/e^2
```

3.132.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 116, normalized size of antiderivative = 0.82

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx = \frac{-120bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2\sqrt{d+ex}(2bn(31d^2-8dex-9e^2x^2)+15a(-2d^2+dex+3e^2x^2)+15b(-}{225e^2}$$

input
```
Integrate[x*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(-120*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(2*b*n*
(31*d^2 - 8*d*e*x - 9*e^2*x^2) + 15*a*(-2*d^2 + d*e*x + 3*e^2*x^2) + 15*b*
(-2*d^2 + d*e*x + 3*e^2*x^2)*Log[c*x^n]))/(225*e^2)
```

3.132.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 131, normalized size of antiderivative = 0.92, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2792, 27, 90, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{2(2d-3ex)(d+ex)^{3/2}}{15e^2x}dx+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{2bn\int \frac{(2d-3ex)(d+ex)^{3/2}}{x}dx}{15e^2}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$$\Big\downarrow \text{90}$$

$$\frac{2bn\left(2d\int \frac{(d+ex)^{3/2}}{x}dx-\frac{6}{5}(d+ex)^{5/2}\right)}{15e^2}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$$\Big\downarrow \text{60}$$

$$\frac{2bn\left(2d\left(d\int \frac{\sqrt{d+ex}}{x}dx+\frac{2}{3}(d+ex)^{3/2}\right)-\frac{6}{5}(d+ex)^{5/2}\right)}{15e^2}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}$$

$$\Big\downarrow \text{60}$$

$$\frac{2bn\left(2d\left(d\left(d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)-\frac{6}{5}(d+ex)^{5/2}\right)}{15e^2}+\frac{2(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}-\frac{2d(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}$$

$$\Big\downarrow \; 73$$

$$\frac{2bn\left(2d\left(d\left(\frac{2d\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)-\frac{6}{5}(d+ex)^{5/2}\right)}{15e^2}+\frac{2(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}-\frac{2d(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}$$

$$\Big\downarrow \; 221$$

$$\frac{2(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}-\frac{2d(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}+\frac{2bn\left(2d\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)-\frac{6}{5}(d+ex)^{5/2}\right)}{15e^2}$$

input
```
Int[x*Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(2*b*n*((-6*(d + e*x)^(5/2))/5 + 2*d*((2*(d + e*x)^(3/2))/3 + d*(2*Sqrt[d
+ e*x] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))))/(15*e^2) - (2*d*(d +
 e*x)^(3/2)*(a + b*Log[c*x^n]))/(3*e^2) + (2*(d + e*x)^(5/2)*(a + b*Log[c*
x^n]))/(5*e^2)
```

3.132.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.132.4 Maple [F]

$$\int x(a+b\ln (c\,x^{n}))\,\sqrt{ex+d}dx$$

input
```
int(x*(a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

3.132.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 291, normalized size of antiderivative = 2.05

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$=\left[\frac{2\left(30\,bd^{\frac{5}{2}}n\log\left(\frac{ex-2\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(62\,bd^2n-30\,ad^2-9\,(2\,be^2n-5\,ae^2)x^2-(16\,bden-15\,ade)x+1\right.}{225\,e^2}\right.$$

input
```
integrate(x*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
[2/225*(30*b*d^(5/2)*n*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) + (62*
b*d^2*n - 30*a*d^2 - 9*(2*b*e^2*n - 5*a*e^2)*x^2 - (16*b*d*e*n - 15*a*d*e)
*x + 15*(3*b*e^2*x^2 + b*d*e*x - 2*b*d^2)*log(c) + 15*(3*b*e^2*n*x^2 + b*d
*e*n*x - 2*b*d^2*n)*log(x))*sqrt(e*x + d))/e^2, 2/225*(60*b*sqrt(-d)*d^2*n
*arctan(sqrt(e*x + d)*sqrt(-d)/d) + (62*b*d^2*n - 30*a*d^2 - 9*(2*b*e^2*n
- 5*a*e^2)*x^2 - (16*b*d*e*n - 15*a*d*e)*x + 15*(3*b*e^2*x^2 + b*d*e*x - 2
*b*d^2)*log(c) + 15*(3*b*e^2*n*x^2 + b*d*e*n*x - 2*b*d^2*n)*log(x))*sqrt(e
*x + d))/e^2]
```

3.132.6 Sympy [A] (verification not implemented)

Time = 56.22 (sec) , antiderivative size = 221, normalized size of antiderivative = 1.56

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx=a\left(\begin{cases}-\frac{2d(d+ex)^{\frac{3}{2}}}{3e^2}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^2} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases}-\frac{124d^{\frac{5}{2}}\sqrt{1+\frac{ex}{d}}}{225e^2}-\frac{4d^{\frac{5}{2}}\log\left(\frac{ex}{d}\right)}{15e^2}+\frac{8d^{\frac{5}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{15e^2}+\frac{32d^{\frac{3}{2}}x\sqrt{1+\frac{ex}{d}}}{225e}+\frac{4\sqrt{d}x^2\sqrt{1+\frac{ex}{d}}}{25} & \text{for } e>-\infty\wedge e<\infty\\ \frac{\sqrt{d}x^2}{4} & \text{otherwise}\end{cases}\right.$$
$$+b\left(\begin{cases}-\frac{2d(d+ex)^{\frac{3}{2}}}{3e^2}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^2} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(a+b*ln(c*x**n))*(e*x+d)**(1/2),x)
```

output
```
a*Piecewise((-2*d*(d + e*x)**(3/2)/(3*e**2) + 2*(d + e*x)**(5/2)/(5*e**2),
 Ne(e, 0)), (sqrt(d)*x**2/2, True)) - b*n*Piecewise((-124*d**(5/2)*sqrt(1
+ e*x/d)/(225*e**2) - 4*d**(5/2)*log(e*x/d)/(15*e**2) + 8*d**(5/2)*log(sqr
t(1 + e*x/d) + 1)/(15*e**2) + 32*d**(3/2)*x*sqrt(1 + e*x/d)/(225*e) + 4*sq
rt(d)*x**2*sqrt(1 + e*x/d)/25, (e > -oo) & (e < oo) & Ne(e, 0)), (sqrt(d)*
x**2/4, True)) + b*Piecewise((-2*d*(d + e*x)**(3/2)/(3*e**2) + 2*(d + e*x)
**(5/2)/(5*e**2), Ne(e, 0)), (sqrt(d)*x**2/2, True))*log(c*x**n)
```

3.132.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.01

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$=\frac{4}{225}\left(\frac{15\,d^{\frac{5}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^2}-\frac{9\,(ex+d)^{\frac{5}{2}}-10\,(ex+d)^{\frac{3}{2}}d-30\,\sqrt{ex+d}d^2}{e^2}\right)bn$$
$$+\frac{2}{15}\,b\left(\frac{3\,(ex+d)^{\frac{5}{2}}}{e^2}-\frac{5\,(ex+d)^{\frac{3}{2}}d}{e^2}\right)\log(cx^n)+\frac{2}{15}\,a\left(\frac{3\,(ex+d)^{\frac{5}{2}}}{e^2}-\frac{5\,(ex+d)^{\frac{3}{2}}d}{e^2}\right)$$

input
```
integrate(x*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
4/225*(15*d^(5/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))
/e^2 - (9*(e*x + d)^(5/2) - 10*(e*x + d)^(3/2)*d - 30*sqrt(e*x + d)*d^2)/e
^2)*b*n + 2/15*b*(3*(e*x + d)^(5/2)/e^2 - 5*(e*x + d)^(3/2)*d/e^2)*log(c*x
^n) + 2/15*a*(3*(e*x + d)^(5/2)/e^2 - 5*(e*x + d)^(3/2)*d/e^2)
```

3.132.8 Giac [F]

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\,dx=\int\sqrt{ex+d}(b\log(cx^n)+a)x\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a)*x, x)
```

3.132.9 Mupad [F(-1)]

Timed out.

$$\int x\sqrt{d+ex}(a+b\log(cx^n))\ dx = \int x\,(a+b\,\ln(c\,x^n))\,\sqrt{d+e\,x}\,dx$$

input
```
int(x*(a + b*log(c*x^n))*(d + e*x)^(1/2),x)
```

output
```
int(x*(a + b*log(c*x^n))*(d + e*x)^(1/2), x)
```

3.133 $\int \sqrt{d+ex}(a+b\log(cx^n))\,dx$

3.133.1 Optimal result

Integrand size = 20, antiderivative size = 94

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx = -\frac{4bdn\sqrt{d+ex}}{3e}-\frac{4bn(d+ex)^{3/2}}{9e}+\frac{4bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}$$

output
```
-4/9*b*n*(e*x+d)^(3/2)/e+4/3*b*d^(3/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e+
2/3*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e-4/3*b*d*n*(e*x+d)^(1/2)/e
```

3.133.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 77, normalized size of antiderivative = 0.82

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx = \frac{2\left(6bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}(3a(d+ex)-2bn(4d+ex)+3b(d+ex)\log(cx^n))\right)}{9e}$$

input
```
Integrate[Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(2*(6*b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(3*a*(d +
 e*x) - 2*b*n*(4*d + e*x) + 3*b*(d + e*x)*Log[c*x^n])))/(9*e)
```

3.133.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 87, normalized size of antiderivative = 0.93, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.250, Rules used = {2756, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\int\frac{(d+ex)^{3/2}}{x}dx}{3e}$$

$$\Big\downarrow \text{60}$$

$$\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\int\frac{\sqrt{d+ex}}{x}dx+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}$$

$$\Big\downarrow \text{60}$$

$$\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(d\int\frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}$$

$$\Big\downarrow \text{73}$$

$$\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(\frac{2d\int\frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}$$

$$\Big\downarrow \text{221}$$

$$\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}$$

input
```
Int[Sqrt[d + e*x]*(a + b*Log[c*x^n]),x]
```

output
```
(-2*b*n*((2*(d + e*x)^(3/2))/3 + d*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh[Sq
rt[d + e*x]/Sqrt[d]])))/(3*e) + (2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/(3*
e)
```

3.133.3.1 Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

3.133.4 Maple [F]

$$\int (a+b\ln (c\,x^{n}))\,\sqrt{ex+d}dx$$

input
```
int((a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))*(e*x+d)^(1/2),x)
```

3.133.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 184, normalized size of antiderivative = 1.96

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx$$
$$=\left[\frac{2\left(3\,bd^{\frac{3}{2}}n\log\left(\frac{ex+2\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)-(8\,bdn-3\,ad+(2\,ben-3\,ae)x-3\,(bex+bd)\log(c)-3\,(benx+bd\right.}{9\,e}\right.$$
$$-\frac{2\left(6\,b\sqrt{-d}dn\arctan\left(\frac{\sqrt{ex+d}\sqrt{-d}}{d}\right)+(8\,bdn-3\,ad+(2\,ben-3\,ae)x-3\,(bex+bd)\log(c)-3\,(benx+\right.}{9\,e}$$

input
```
integrate((a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
[2/9*(3*b*d^(3/2)*n*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) - (8*b*d*
n - 3*a*d + (2*b*e*n - 3*a*e)*x - 3*(b*e*x + b*d)*log(c) - 3*(b*e*n*x + b*
d*n)*log(x))*sqrt(e*x + d))/e, -2/9*(6*b*sqrt(-d)*d*n*arctan(sqrt(e*x + d)
*sqrt(-d)/d) + (8*b*d*n - 3*a*d + (2*b*e*n - 3*a*e)*x - 3*(b*e*x + b*d)*lo
g(c) - 3*(b*e*n*x + b*d*n)*log(x))*sqrt(e*x + d))/e]
```

3.133.6 Sympy [A] (verification not implemented)

Time = 29.54 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.53

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx = a\left(\begin{cases}\frac{2(d+ex)^{\frac{3}{2}}}{3e} & \text{for } e\neq 0\\ \sqrt{d}x & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases}\frac{16d^{\frac{3}{2}}\sqrt{1+\frac{ex}{d}}}{9e}+\frac{2d^{\frac{3}{2}}\log\left(\frac{ex}{d}\right)}{3e}-\frac{4d^{\frac{3}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{3e}+\frac{4\sqrt{d}x\sqrt{1+\frac{ex}{d}}}{9} & \text{for } e>-\infty\wedge e<\infty\wedge e\neq 0\\ \sqrt{d}x & \text{otherwise}\end{cases}\right)$$
$$+b\left(\begin{cases}\frac{2(d+ex)^{\frac{3}{2}}}{3e} & \text{for } e\neq 0\\ \sqrt{d}x & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((a+b*ln(c*x**n))*(e*x+d)**(1/2),x)
```

output
```
a*Piecewise((2*(d + e*x)**(3/2)/(3*e), Ne(e, 0)), (sqrt(d)*x, True)) - b*n
*Piecewise((16*d**(3/2)*sqrt(1 + e*x/d)/(9*e) + 2*d**(3/2)*log(e*x/d)/(3*e
) - 4*d**(3/2)*log(sqrt(1 + e*x/d) + 1)/(3*e) + 4*sqrt(d)*x*sqrt(1 + e*x/d
)/9, (e > -oo) & (e < oo) & Ne(e, 0)), (sqrt(d)*x, True)) + b*Piecewise((2
*(d + e*x)**(3/2)/(3*e), Ne(e, 0)), (sqrt(d)*x, True))*log(c*x**n)
```

3.133.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 93, normalized size of antiderivative = 0.99

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx = \frac{2\,(ex+d)^{\frac{3}{2}}b\log(cx^n)}{3\,e} - \frac{2\left(3\,d^{\frac{3}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)+2\,(ex+d)^{\frac{3}{2}}+6\,\sqrt{ex+d}d\right)bn}{9\,e} + \frac{2\,(ex+d)^{\frac{3}{2}}a}{3\,e}$$

input
```
integrate((a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
2/3*(e*x + d)^(3/2)*b*log(c*x^n)/e - 2/9*(3*d^(3/2)*log((sqrt(e*x + d) - s
qrt(d))/(sqrt(e*x + d) + sqrt(d))) + 2*(e*x + d)^(3/2) + 6*sqrt(e*x + d)*d
)*b*n/e + 2/3*(e*x + d)^(3/2)*a/e
```

3.133.8 Giac [F]

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx = \int \sqrt{ex+d}(b\log(cx^n)+a)\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a), x)
```

3.133.9 Mupad [F(-1)]

Timed out.

$$\int \sqrt{d+ex}(a+b\log(cx^n))\,dx = \int (a+b\,\ln(c\,x^n))\,\sqrt{d+e\,x}\,dx$$

input
```
int((a + b*log(c*x^n))*(d + e*x)^(1/2),x)
```

output
```
int((a + b*log(c*x^n))*(d + e*x)^(1/2), x)
```

3.134 $\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx$

3.134.1 Optimal result

Integrand size = 23, antiderivative size = 211

$$\begin{aligned}\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx &= -4bn\sqrt{d+ex}+4b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\\ &\quad+2b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2+2\sqrt{d+ex}(a+b\log(cx^n))\\ &\quad-2\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))\\ &\quad-4b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\\ &\quad-2b\sqrt{d}n\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\end{aligned}$$

output
```
4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*d^(1/2)+2*b*n*arctanh((e*x+d)^(1/2)/d
^(1/2))^2*d^(1/2)-2*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*d^(1/2)
-4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2))
)*d^(1/2)-2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))*d^(1/2)-4*b
*n*(e*x+d)^(1/2)+2*(a+b*ln(c*x^n))*(e*x+d)^(1/2)
```

3.134.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 332, normalized size of antiderivative = 1.57

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx = 2a\sqrt{d+ex}-4bn\sqrt{d+ex}+4b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2b\sqrt{d+ex}\log(cx^n)+\sqrt{d}(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right)-\sqrt{d}(a+b\log(cx^n))\log\left(\sqrt{d}+\sqrt{d+ex}\right)-\frac{1}{2}b\sqrt{d}n\left(\log\left(\sqrt{d}-\sqrt{d+ex}\right)\left(\log\left(\sqrt{d}-\sqrt{d+ex}\right)+2\log\left(\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)\right)+2\,\text{PolyLog}\left(2,\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)\right)+\frac{1}{2}b\sqrt{d}n\left(\log\left(\sqrt{d}+\sqrt{d+ex}\right)\left(\log\left(\sqrt{d}+\sqrt{d+ex}\right)+2\log\left(\frac{1}{2}-\frac{\sqrt{d+ex}}{2\sqrt{d}}\right)\right)+2\,\text{PolyLog}\left(2,\frac{1}{2}\left(1+\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)\right)$$

input
```
Integrate[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x,x]
```

output
```
2*a*Sqrt[d + e*x] - 4*b*n*Sqrt[d + e*x] + 4*b*Sqrt[d]*n*ArcTanh[Sqrt[d + e
*x]/Sqrt[d]] + 2*b*Sqrt[d + e*x]*Log[c*x^n] + Sqrt[d]*(a + b*Log[c*x^n])*L
og[Sqrt[d] - Sqrt[d + e*x]] - Sqrt[d]*(a + b*Log[c*x^n])*Log[Sqrt[d] + Sqr
t[d + e*x]] - (b*Sqrt[d]*n*(Log[Sqrt[d] - Sqrt[d + e*x]]*(Log[Sqrt[d] - Sq
rt[d + e*x]] + 2*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2]) + 2*PolyLog[2, 1/2 -
Sqrt[d + e*x]/(2*Sqrt[d])]))/2 + (b*Sqrt[d]*n*(Log[Sqrt[d] + Sqrt[d + e*x]
]*(Log[Sqrt[d] + Sqrt[d + e*x]] + 2*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])])
+ 2*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2]))/2
```

3.134.3 Rubi [A] (verified)

Time = 1.02 (sec) , antiderivative size = 217, normalized size of antiderivative = 1.03, number of steps used = 16, number of rules used = 15, $\frac{\text{number of rules}}{\text{integrand size}} = 0.652$, Rules used = {2788, 2756, 60, 73, 221, 2790, 27, 7267, 25, 6546, 27, 6470, 27, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \text{2788}$$

$$e\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}dx+d\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{2756}$$

$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\int \frac{\sqrt{d+ex}}{x}dx}{e}\right)+d\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{60}$$

$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)}{e}\right)+d\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{73}$$

$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(\frac{2d\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)}{e}\right)+d\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{221}$$

$$d\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{2790}$$

$$d\left(-bn\int -\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}x}dx-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+$$
$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{27}$$

$$d\left(\frac{2bn\int\frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{7267}$$

$$d\left(\frac{4bn\int\frac{\sqrt{d+ex}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{25}$$

$$d\left(-\frac{4bn\int-\frac{\sqrt{d+ex}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{6546}$$

$$d\left(\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\frac{\int\frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{27}$$

3.134. $\int\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx$

$$d\left(\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\int \frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+$$
$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{6470}$$

$$d\left(\frac{4bn\left(\frac{\int -\frac{d\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+e}}{\sqrt{d}}\right.}{}\right.$$
$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{27}$$

$$d\left(\frac{4bn\left(\sqrt{d}\int -\frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}(}{}\right.$$
$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{2849}$$

$$d\left(\frac{4bn\left(-\sqrt{d}\int \frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}}d\frac{1}{\sqrt{d}-\sqrt{d+ex}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctan}}{}\right.$$
$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

$$\Big\downarrow \text{2752}$$

3.134. $\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx$

$$d\left(\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\right.}{}\right.$$

$$e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)$$

input
```
Int[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x,x]
```

output
```
e*((-2*b*n*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/e
 + (2*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e) + d*((-2*ArcTanh[Sqrt[d + e*x]/
Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[d] + (4*b*n*(ArcTanh[Sqrt[d + e*x]/Sqrt[
d]]^2/2 - ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d
 + e*x])] - PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])]/2))/Sqrt
[d])
```

3.134.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2788
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Simp[d   Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x)
, x], x] + Simp[e   Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

3.134. $\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx$

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

3.134.4 Maple [F]

$$\int \frac{(a+b\ln(c\,x^{n}))\sqrt{ex+d}}{x}dx$$

input
```
int((a+b*ln(c*x^n))*(e*x+d)^(1/2)/x,x)
```

output
```
int((a+b*ln(c*x^n))*(e*x+d)^(1/2)/x,x)
```

3.134.5 Fricas [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x,x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/x, x)
```

3.134.6 Sympy [F]

$$\int \frac{\sqrt{d+ex}(a+b\log{(cx^n)})}{x}\,dx = \int \frac{(a+b\log{(cx^n)})\sqrt{d+ex}}{x}\,dx$$

input
```
integrate((a+b*ln(c*x**n))*(e*x+d)**(1/2)/x,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x)/x, x)
```

3.134.7 Maxima [F]

$$\int \frac{\sqrt{d+ex}(a+b\log{(cx^n)})}{x}\,dx = \int \frac{\sqrt{ex+d}(b\log{(cx^n)}+a)}{x}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x,x, algorithm="maxima")
```

output
```
(sqrt(d)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d))) + 2*sqrt
(e*x + d))*a + b*integrate(sqrt(e*x + d)*(log(c) + log(x^n))/x, x)
```

3.134.8 Giac [F]

$$\int \frac{\sqrt{d+ex}(a+b\log{(cx^n)})}{x}\,dx = \int \frac{\sqrt{ex+d}(b\log{(cx^n)}+a)}{x}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a)/x, x)
```

3.134.9 Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}\,dx = \int \frac{(a+b\,\ln(c\,x^n))\,\sqrt{d+e\,x}}{x}\,dx$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x,x)
```

output
```
int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x, x)
```

3.135 $\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx$

3.135.1 Optimal result

Integrand size = 23, antiderivative size = 221

$$\begin{aligned}\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx = & -\frac{bn\sqrt{d+ex}}{x}-\frac{ben\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}} \\ & +\frac{ben\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x} \\ & -\frac{e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} \\ & -\frac{2ben\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}} \\ & -\frac{ben\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}}\end{aligned}$$

output
```
-b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(1/2)+b*e*n*arctanh((e*x+d)^(1/2)/
d^(1/2))^2/d^(1/2)-e*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2
)-2*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/
2)))/d^(1/2)-b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(1/2)-
b*n*(e*x+d)^(1/2)/x-(a+b*ln(c*x^n))*(e*x+d)^(1/2)/x
```

3.135.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 392, normalized size of antiderivative = 1.77

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx =$$

$$-\frac{4a\sqrt{d}\sqrt{d+ex}+4b\sqrt{d}n\sqrt{d+ex}+4benx\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+4b\sqrt{d}\sqrt{d+ex}\log(cx^n)-2aex\log\left(\sqrt{d}-\right.}{}$$

input
```
Integrate[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-1/4*(4*a*Sqrt[d]*Sqrt[d + e*x] + 4*b*Sqrt[d]*n*Sqrt[d + e*x] + 4*b*e*n*x*
ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 4*b*Sqrt[d]*Sqrt[d + e*x]*Log[c*x^n] - 2*
a*e*x*Log[Sqrt[d] - Sqrt[d + e*x]] - 2*b*e*x*Log[c*x^n]*Log[Sqrt[d] - Sqrt
[d + e*x]] + b*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]^2 + 2*a*e*x*Log[Sqrt[d]
+ Sqrt[d + e*x]] + 2*b*e*x*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] - b*e*n
*x*Log[Sqrt[d] + Sqrt[d + e*x]]^2 - 2*b*e*n*x*Log[Sqrt[d] + Sqrt[d + e*x]]
*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])] + 2*b*e*n*x*Log[Sqrt[d] - Sqrt[d + e
*x]]*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2] + 2*b*e*n*x*PolyLog[2, 1/2 - Sqrt[
d + e*x]/(2*Sqrt[d])] - 2*b*e*n*x*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2
])/(Sqrt[d]*x)
```

3.135.3 Rubi [A] (verified)

Time = 0.54 (sec) , antiderivative size = 215, normalized size of antiderivative = 0.97, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2792, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{\frac{ex\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}+\sqrt{d+ex}}{x^2}dx-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \; 25$$

$$bn\int \frac{\frac{ex\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}+\sqrt{d+ex}}{x^2}dx-\frac{e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \; 2010$$

$$bn\int \left(\frac{e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}x}+\frac{\sqrt{d+ex}}{x^2}\right)dx-\frac{e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \; 2009$$

$$-\frac{e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}+ bn\left(\frac{e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}}-\frac{e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{2e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}}-\frac{e\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+}}\right.}{\sqrt{d}}\right.$$

input
```
Int[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x) - (e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]
]*(a + b*Log[c*x^n]))/Sqrt[d] + b*n*(-(Sqrt[d + e*x]/x) - (e*ArcTanh[Sqrt[
d + e*x]/Sqrt[d]])/Sqrt[d] + (e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2)/Sqrt[d]
- (2*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d +
e*x])])/Sqrt[d] - (e*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])]
)/Sqrt[d])
```

3.135.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.135.4 Maple [F]

$$\int \frac{(a+b\ln(c\,x^n))\,\sqrt{ex+d}}{x^2}dx$$

input
```
int((a+b*ln(c*x^n))*(e*x+d)^(1/2)/x^2,x)
```

output
```
int((a+b*ln(c*x^n))*(e*x+d)^(1/2)/x^2,x)
```

3.135.5 Fricas [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x^2,x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/x^2, x)
```

3.135.6 Sympy [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex}}{x^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))*(e*x+d)**(1/2)/x**2,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x)/x**2, x)
```

3.135.7 Maxima [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x^2,x, algorithm="maxima")
```

output
```
1/2*(e*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/sqrt(d) -
2*sqrt(e*x + d)/x)*a + b*integrate(sqrt(e*x + d)*(log(c) + log(x^n))/x^2,
x)
```

3.135.8 Giac [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x^2,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a)/x^2, x)
```

3.135.9 Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex}(a+b\log{(cx^n)})}{x^2}\,dx = \int \frac{(a+b\,\ln{(c\,x^n)})\,\sqrt{d+e\,x}}{x^2}\,dx$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x^2,x)
```

output
```
int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x^2, x)
```

3.136 $\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx$

3.136.1 Optimal result

Integrand size = 23, antiderivative size = 298

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx = -\frac{bn\sqrt{d+ex}}{4x^2} - \frac{3ben\sqrt{d+ex}}{8dx} - \frac{be^2n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8d^{3/2}} - \frac{be^2n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4d^{3/2}} - \frac{\sqrt{d+ex}(a+b\log(cx^n))}{2x^2} - \frac{e\sqrt{d+ex}(a+b\log(cx^n))}{4dx} + \frac{e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{3/2}} + \frac{be^2n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{2d^{3/2}} + \frac{be^2n\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{4d^{3/2}}$$

output
```
-1/8*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(3/2)-1/4*b*e^2*n*arctanh((e
*x+d)^(1/2)/d^(1/2))^2/d^(3/2)+1/4*e^2*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b
*ln(c*x^n))/d^(3/2)+1/2*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2
)/(d^(1/2)-(e*x+d)^(1/2)))/d^(3/2)+1/4*b*e^2*n*polylog(2,1-2*d^(1/2)/(d^(1
/2)-(e*x+d)^(1/2)))/d^(3/2)-1/4*b*n*(e*x+d)^(1/2)/x^2-3/8*b*e*n*(e*x+d)^(1
/2)/d/x-1/2*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/x^2-1/4*e*(a+b*ln(c*x^n))*(e*x+d
)^(1/2)/d/x
```

3.136.2 Mathematica [A] (verified)

Time = 0.34 (sec) , antiderivative size = 500, normalized size of antiderivative = 1.68

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3} dx =$$
$$-\frac{8ad^{3/2}\sqrt{d+ex}+4bd^{3/2}n\sqrt{d+ex}+4a\sqrt{d}ex\sqrt{d+ex}+6b\sqrt{d}enx\sqrt{d+ex}+2be^2nx^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{}$$

input
```
Integrate[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/16*(8*a*d^(3/2)*Sqrt[d + e*x] + 4*b*d^(3/2)*n*Sqrt[d + e*x] + 4*a*Sqrt[
d]*e*x*Sqrt[d + e*x] + 6*b*Sqrt[d]*e*n*x*Sqrt[d + e*x] + 2*b*e^2*n*x^2*Arc
Tanh[Sqrt[d + e*x]/Sqrt[d]] + 8*b*d^(3/2)*Sqrt[d + e*x]*Log[c*x^n] + 4*b*S
qrt[d]*e*x*Sqrt[d + e*x]*Log[c*x^n] + 2*a*e^2*x^2*Log[Sqrt[d] - Sqrt[d + e
*x]] + 2*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] - Sqrt[d + e*x]] - b*e^2*n*x^2*L
og[Sqrt[d] - Sqrt[d + e*x]]^2 - 2*a*e^2*x^2*Log[Sqrt[d] + Sqrt[d + e*x]] -
 2*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] + b*e^2*n*x^2*Log[Sqr
t[d] + Sqrt[d + e*x]]^2 + 2*b*e^2*n*x^2*Log[Sqrt[d] + Sqrt[d + e*x]]*Log[1
/2 - Sqrt[d + e*x]/(2*Sqrt[d])] - 2*b*e^2*n*x^2*Log[Sqrt[d] - Sqrt[d + e*x
]]*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2] - 2*b*e^2*n*x^2*PolyLog[2, 1/2 - Sqr
t[d + e*x]/(2*Sqrt[d])] + 2*b*e^2*n*x^2*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt
[d])/2])/(d^(3/2)*x^2)
```

3.136.3 Rubi [A] (verified)

Time = 0.62 (sec) , antiderivative size = 276, normalized size of antiderivative = 0.93, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3} dx$$
$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{\sqrt{d}\sqrt{d+ex}(2d+ex)-e^2x^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{4d^{3/2}x^3}dx+\frac{e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{3/2}}-\frac{e\sqrt{d+ex}(a+b\log(cx^n))}{4dx}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{\sqrt{d}\sqrt{d+ex}(2d+ex)-e^2x^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x^3}dx}{4d^{3/2}}+\frac{e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{3/2}}-\frac{e\sqrt{d+ex}(a+b\log(cx^n))}{4dx}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{2010}$$

$$\frac{bn\int \left(-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)e^2}{x}+\frac{\sqrt{d}\sqrt{d+ex}e}{x^2}+\frac{2d^{3/2}\sqrt{d+ex}}{x^3}\right)dx}{4d^{3/2}}+\frac{e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{3/2}}-\frac{e\sqrt{d+ex}(a+b\log(cx^n))}{4dx}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{3/2}}-\frac{e\sqrt{d+ex}(a+b\log(cx^n))}{4dx}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2x^2}+\frac{bn\left(e^2\left(-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2\right)-\frac{1}{2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\frac{d^{3/2}\sqrt{d+ex}}{x^2}+e^2\text{ Po}}{4d^{3/2}}$$

input
```
Int[(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/2*(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/x^2 - (e*Sqrt[d + e*x]*(a + b*Log[
c*x^n]))/(4*d*x) + (e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]))
/(4*d^(3/2)) + (b*n*(-((d^(3/2)*Sqrt[d + e*x])/x^2) - (3*Sqrt[d]*e*Sqrt[d
+ e*x])/(2*x) - (e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/2 - e^2*ArcTanh[Sqrt[
d + e*x]/Sqrt[d]]^2 + 2*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])
/(Sqrt[d] - Sqrt[d + e*x])] + e^2*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sq
rt[d + e*x])]))/(4*d^(3/2))
```

3.136. $\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx$

3.136.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.136.4 Maple [F]

$$\int \frac{(a+b\ln(c\,x^{n}))\sqrt{ex+d}}{x^{3}}dx$$

input
```
int((a+b*ln(c*x^n))*(e*x+d)^(1/2)/x^3,x)
```

output
```
int((a+b*ln(c*x^n))*(e*x+d)^(1/2)/x^3,x)
```

3.136.5 Fricas [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^{n}))}{x^{3}}\,dx=\int \frac{\sqrt{ex+d}(b\log(cx^{n})+a)}{x^{3}}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x^3,x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/x^3, x)
```

3.136.6 Sympy [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex}}{x^3}\,dx$$

input
```
integrate((a+b*ln(c*x**n))*(e*x+d)**(1/2)/x**3,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x)/x**3, x)
```

3.136.7 Maxima [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x^3,x, algorithm="maxima")
```

output
```
-1/8*(e^2*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/d^(3/2)
 + 2*((e*x + d)^(3/2)*e^2 + sqrt(e*x + d)*d*e^2)/((e*x + d)^2*d - 2*(e*x +
 d)*d^2 + d^3))*a + b*integrate(sqrt(e*x + d)*(log(c) + log(x^n))/x^3, x)
```

3.136.8 Giac [F]

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{\sqrt{ex+d}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x+d)^(1/2)/x^3,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x + d)*(b*log(c*x^n) + a)/x^3, x)
```

3.136.9 Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(a+b\,\ln(c\,x^n))\,\sqrt{d+e\,x}}{x^3}\,dx$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x^3,x)
```

output
```
int(((a + b*log(c*x^n))*(d + e*x)^(1/2))/x^3, x)
```

3.137 $\int x^3(d+ex)^{3/2}(a+b\log(cx^n))\,dx$

3.137.1 Optimal result

Integrand size = 23, antiderivative size = 263

$$\int x^3(d+ex)^{3/2}(a+b\log(cx^n))\,dx = \frac{64bd^5n\sqrt{d+ex}}{1155e^4} + \frac{64bd^4n(d+ex)^{3/2}}{3465e^4} + \frac{64bd^3n(d+ex)^{5/2}}{5775e^4} - \frac{172bd^2n(d+ex)^{7/2}}{1617e^4} + \frac{32bdn(d+ex)^{9/2}}{297e^4} - \frac{4bn(d+ex)^{11/2}}{121e^4} - \frac{64bd^{11/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{1155e^4} - \frac{2d^3(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4} + \frac{6d^2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4} - \frac{2d(d+ex)^{9/2}(a+b\log(cx^n))}{3e^4} + \frac{2(d+ex)^{11/2}(a+b\log(cx^n))}{11e^4}$$

output
```
64/3465*b*d^4*n*(e*x+d)^(3/2)/e^4+64/5775*b*d^3*n*(e*x+d)^(5/2)/e^4-172/16
17*b*d^2*n*(e*x+d)^(7/2)/e^4+32/297*b*d*n*(e*x+d)^(9/2)/e^4-4/121*b*n*(e*x
+d)^(11/2)/e^4-64/1155*b*d^(11/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^4-2/5
*d^3*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^4+6/7*d^2*(e*x+d)^(7/2)*(a+b*ln(c*x^n
))/e^4-2/3*d*(e*x+d)^(9/2)*(a+b*ln(c*x^n))/e^4+2/11*(e*x+d)^(11/2)*(a+b*ln
(c*x^n))/e^4+64/1155*b*d^5*n*(e*x+d)^(1/2)/e^4
```

3.137.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 187, normalized size of antiderivative = 0.71

$$\int x^3(d+ex)^{3/2}(a+b\log(cx^n))\,dx = \frac{-221760bd^{11/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2\sqrt{d+ex}(-3465a(d+ex)^2(16d^3-40d^2ex+70de^2x$$

input
```
Integrate[x^3*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-221760*b*d^(11/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(-3
465*a*(d + e*x)^2*(16*d^3 - 40*d^2*e*x + 70*d*e^2*x^2 - 105*e^3*x^3) + 2*b
*n*(53308*d^5 - 12794*d^4*e*x + 7863*d^3*e^2*x^2 - 5975*d^2*e^3*x^3 - 5757
5*d*e^4*x^4 - 33075*e^5*x^5) - 3465*b*(d + e*x)^2*(16*d^3 - 40*d^2*e*x + 7
0*d*e^2*x^2 - 105*e^3*x^3)*Log[c*x^n]))/(4002075*e^4)
```

3.137.3 Rubi [A] (verified)

Time = 0.52 (sec) , antiderivative size = 234, normalized size of antiderivative = 0.89, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2792, 27, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex)^{3/2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{2(d+ex)^{5/2}(16d^3-40exd^2+70e^2x^2d-105e^3x^3)}{1155e^4x}dx-\frac{2d^3(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{6d^2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}+\frac{2(d+ex)^{11/2}(a+b\log(cx^n))}{11e^4}-\frac{2d(d+ex)^{9/2}(a+b\log(cx^n))}{3e^4}$$

$$\Big\downarrow \text{27}$$

$$\frac{2bn\int\frac{(d+ex)^{5/2}(16d^3-40exd^2+70e^2x^2d-105e^3x^3)}{x}dx}{1155e^4}-\frac{2d^3(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{6d^2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}+\frac{2(d+ex)^{11/2}(a+b\log(cx^n))}{11e^4}-\frac{2d(d+ex)^{9/2}(a+b\log(cx^n))}{3e^4}$$

$$\Big\downarrow \text{2123}$$

$$\frac{2bn\int\left(-105e(d+ex)^{9/2}+280de(d+ex)^{7/2}-215d^2e(d+ex)^{5/2}+\frac{16d^3(d+ex)^{5/2}}{x}\right)dx}{1155e^4}-\frac{2d^3(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^4}+\frac{6d^2(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^4}+\frac{2(d+ex)^{11/2}\left(a+b\log\left(cx^n\right)\right)}{11e^4}-\frac{2d(d+ex)^{9/2}\left(a+b\log\left(cx^n\right)\right)}{3e^4}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2d^3(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^4}+\frac{6d^2(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^4}+\frac{2(d+ex)^{11/2}\left(a+b\log\left(cx^n\right)\right)}{11e^4}-\frac{2d(d+ex)^{9/2}\left(a+b\log\left(cx^n\right)\right)}{3e^4}+\frac{2bn\left(-32d^{11/2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+32d^5\sqrt{d+ex}+\frac{32}{3}d^4(d+ex)^{3/2}+\frac{32}{5}d^3(d+ex)^{5/2}-\frac{430}{7}d^2(d+ex)^{7/2}+\frac{560}{9}d(d}{1155e^4}$$

input
```
Int[x^3*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(2*b*n*(32*d^5*Sqrt[d + e*x] + (32*d^4*(d + e*x)^(3/2))/3 + (32*d^3*(d + e
*x)^(5/2))/5 - (430*d^2*(d + e*x)^(7/2))/7 + (560*d*(d + e*x)^(9/2))/9 - (
210*(d + e*x)^(11/2))/11 - 32*d^(11/2)*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/(1
155*e^4) - (2*d^3*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^4) + (6*d^2*(d
+ e*x)^(7/2)*(a + b*Log[c*x^n]))/(7*e^4) - (2*d*(d + e*x)^(9/2)*(a + b*Log
[c*x^n]))/(3*e^4) + (2*(d + e*x)^(11/2)*(a + b*Log[c*x^n]))/(11*e^4)
```

3.137.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.137.4 Maple [F]

$$\int x^3(ex+d)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^n\right)\right)dx$$

input
```
int(x^3*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^3*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

3.137.5 Fricas [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 595, normalized size of antiderivative = 2.26

$$\int x^3(d+ex)^{3/2}(a+b\log(cx^n))\,dx = \left[\frac{2\left(55440\,bd^{\frac{11}{2}}n\log\left(\frac{ex-2\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(106616\,bd^5n-55440\,ad^5-33075\,(2\,be^5n-11\right.}{}\right.$$

input
```
integrate(x^3*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[2/4002075*(55440*b*d^(11/2)*n*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x
) + (106616*b*d^5*n - 55440*a*d^5 - 33075*(2*b*e^5*n - 11*a*e^5)*x^5 - 245
0*(47*b*d*e^4*n - 198*a*d*e^4)*x^4 - 25*(478*b*d^2*e^3*n - 693*a*d^2*e^3)*
x^3 + 6*(2621*b*d^3*e^2*n - 3465*a*d^3*e^2)*x^2 - 4*(6397*b*d^4*e*n - 6930
*a*d^4*e)*x + 3465*(105*b*e^5*x^5 + 140*b*d*e^4*x^4 + 5*b*d^2*e^3*x^3 - 6*
b*d^3*e^2*x^2 + 8*b*d^4*e*x - 16*b*d^5)*log(c) + 3465*(105*b*e^5*n*x^5 + 1
40*b*d*e^4*n*x^4 + 5*b*d^2*e^3*n*x^3 - 6*b*d^3*e^2*n*x^2 + 8*b*d^4*e*n*x -
 16*b*d^5*n)*log(x))*sqrt(e*x + d))/e^4, 2/4002075*(110880*b*sqrt(-d)*d^5*
n*arctan(sqrt(e*x + d)*sqrt(-d)/d) + (106616*b*d^5*n - 55440*a*d^5 - 33075
*(2*b*e^5*n - 11*a*e^5)*x^5 - 2450*(47*b*d*e^4*n - 198*a*d*e^4)*x^4 - 25*(
478*b*d^2*e^3*n - 693*a*d^2*e^3)*x^3 + 6*(2621*b*d^3*e^2*n - 3465*a*d^3*e^
2)*x^2 - 4*(6397*b*d^4*e*n - 6930*a*d^4*e)*x + 3465*(105*b*e^5*x^5 + 140*b
*d*e^4*x^4 + 5*b*d^2*e^3*x^3 - 6*b*d^3*e^2*x^2 + 8*b*d^4*e*x - 16*b*d^5)*l
og(c) + 3465*(105*b*e^5*n*x^5 + 140*b*d*e^4*n*x^4 + 5*b*d^2*e^3*n*x^3 - 6*
b*d^3*e^2*n*x^2 + 8*b*d^4*e*n*x - 16*b*d^5*n)*log(x))*sqrt(e*x + d))/e^4]
```

3.137.6 Sympy [F(-1)]

Timed out.

$$\int x^3(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\text{Timed out}$$

input
```
integrate(x**3*(e*x+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

3.137.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 239, normalized size of antiderivative = 0.91

$$\int x^3(d+ex)^{3/2}(a+b\log\left(cx^n\right))\,dx=\frac{4}{4002075}\left(\frac{27720\,d^{\frac{11}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^4}-\frac{33075\,(ex+d)^{\frac{11}{2}}-107800\,(ex+d)^{\frac{9}{2}}d+106425\right.$$
$$+\frac{2}{1155}\left(\frac{105\,(ex+d)^{\frac{11}{2}}}{e^4}-\frac{385\,(ex+d)^{\frac{9}{2}}d}{e^4}+\frac{495\,(ex+d)^{\frac{7}{2}}d^2}{e^4}-\frac{231\,(ex+d)^{\frac{5}{2}}d^3}{e^4}\right)b\log\left(cx^n\right)$$
$$+\frac{2}{1155}\left(\frac{105\,(ex+d)^{\frac{11}{2}}}{e^4}-\frac{385\,(ex+d)^{\frac{9}{2}}d}{e^4}+\frac{495\,(ex+d)^{\frac{7}{2}}d^2}{e^4}-\frac{231\,(ex+d)^{\frac{5}{2}}d^3}{e^4}\right)a$$

input
```
integrate(x^3*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
4/4002075*(27720*d^(11/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + s
qrt(d)))/e^4 - (33075*(e*x + d)^(11/2) - 107800*(e*x + d)^(9/2)*d + 106425
*(e*x + d)^(7/2)*d^2 - 11088*(e*x + d)^(5/2)*d^3 - 18480*(e*x + d)^(3/2)*d
^4 - 55440*sqrt(e*x + d)*d^5)/e^4)*b*n + 2/1155*(105*(e*x + d)^(11/2)/e^4
- 385*(e*x + d)^(9/2)*d/e^4 + 495*(e*x + d)^(7/2)*d^2/e^4 - 231*(e*x + d)^
(5/2)*d^3/e^4)*b*log(c*x^n) + 2/1155*(105*(e*x + d)^(11/2)/e^4 - 385*(e*x
+ d)^(9/2)*d/e^4 + 495*(e*x + d)^(7/2)*d^2/e^4 - 231*(e*x + d)^(5/2)*d^3/e
^4)*a
```

3.137.8 Giac [F]

$$\int x^3(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\int(ex+d)^{\frac{3}{2}}(b\log\left(cx^n\right)+a)x^3\,dx$$

input
```
integrate(x^3*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a)*x^3, x)
```

3.137.9 Mupad [F(-1)]

Timed out.

$$\int x^3(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,{\left(d+e\,x\right)}^{3/2}\,dx$$

input
```
int(x^3*(a + b*log(c*x^n))*(d + e*x)^(3/2),x)
```

output
```
int(x^3*(a + b*log(c*x^n))*(d + e*x)^(3/2), x)
```

3.138 $\int x^2(d+ex)^{3/2}(a+b\log(cx^n))\,dx$

3.138.1 Optimal result

Integrand size = 23, antiderivative size = 213

$$\begin{aligned}\int x^2(d+ex)^{3/2}(a+b\log(cx^n))\,dx &= -\frac{32bd^4n\sqrt{d+ex}}{315e^3}-\frac{32bd^3n(d+ex)^{3/2}}{945e^3}\\&-\frac{32bd^2n(d+ex)^{5/2}}{1575e^3}+\frac{44bdn(d+ex)^{7/2}}{441e^3}-\frac{4bn(d+ex)^{9/2}}{81e^3}\\&+\frac{32bd^{9/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{315e^3}+\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}\\&-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}\end{aligned}$$

output
```
-32/945*b*d^3*n*(e*x+d)^(3/2)/e^3-32/1575*b*d^2*n*(e*x+d)^(5/2)/e^3+44/441
*b*d*n*(e*x+d)^(7/2)/e^3-4/81*b*n*(e*x+d)^(9/2)/e^3+32/315*b*d^(9/2)*n*arc
tanh((e*x+d)^(1/2)/d^(1/2))/e^3+2/5*d^2*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^3-
4/7*d*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e^3+2/9*(e*x+d)^(9/2)*(a+b*ln(c*x^n))/
e^3-32/315*b*d^4*n*(e*x+d)^(1/2)/e^3
```

3.138.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 153, normalized size of antiderivative = 0.72

$$\int x^2(d+ex)^{3/2}(a+b\log(cx^n))\,dx = \frac{2\left(5040bd^{9/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}(315a(d+ex)^2(8d^2-20dex+35e^2x^2)-2bn(\ldots$$

input
```
Integrate[x^2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(2*(5040*b*d^(9/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(315*a
*(d + e*x)^2*(8*d^2 - 20*d*e*x + 35*e^2*x^2) - 2*b*n*(2614*d^4 - 677*d^3*e
*x + 429*d^2*e^2*x^2 + 2425*d*e^3*x^3 + 1225*e^4*x^4) + 315*b*(d + e*x)^2*
(8*d^2 - 20*d*e*x + 35*e^2*x^2)*Log[c*x^n])))/(99225*e^3)
```

3.138.3 Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 207, normalized size of antiderivative = 0.97, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.261, Rules used = {2792, 27, 1192, 25, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex)^{3/2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{2(d+ex)^{5/2}(8d^2-20exd+35e^2x^2)}{315e^3x}dx+\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{27}$$

$$-\frac{2bn\int \frac{(d+ex)^{5/2}(8d^2-20exd+35e^2x^2)}{x}dx}{315e^3}+\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{1192}$$

$$-\frac{4bn\int \frac{(d+ex)^3(63d^2e^2+35(d+ex)^2e^2-90d(d+ex)e^2)}{ex}d\sqrt{d+ex}}{315e^5}+\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{ 25}$$

$$\frac{4bn\int -\frac{(d+ex)^3(63d^2e^2+35(d+ex)^2e^2-90d(d+ex)e^2)}{ex}d\sqrt{d+ex}}{315e^5}+\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{ 1584}$$

$$\frac{4bn\int \left(-\frac{8ed^5}{x}-8e^2d^4-8e^2(d+ex)d^3-8e^2(d+ex)^2d^2+55e^2(d+ex)^3d-35e^2(d+ex)^4\right)d\sqrt{d+ex}}{315e^5}+\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{2d^2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{2(d+ex)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{4d(d+ex)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{4bn\left(-8d^{9/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+8d^4e^2\sqrt{d+ex}+\frac{8}{3}d^3e^2(d+ex)^{3/2}+\frac{8}{5}d^2e^2(d+ex)^{5/2}-\frac{55}{7}de^2(d+ex)^{7/2}+\frac{35}{9}e\right.}{315e^5}$$

input
```
Int[x^2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-4*b*n*(8*d^4*e^2*Sqrt[d + e*x] + (8*d^3*e^2*(d + e*x)^(3/2))/3 + (8*d^2*
e^2*(d + e*x)^(5/2))/5 - (55*d*e^2*(d + e*x)^(7/2))/7 + (35*e^2*(d + e*x)^
(9/2))/9 - 8*d^(9/2)*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/(315*e^5) + (2*d
^2*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^3) - (4*d*(d + e*x)^(7/2)*(a +
 b*Log[c*x^n]))/(7*e^3) + (2*(d + e*x)^(9/2)*(a + b*Log[c*x^n]))/(9*e^3)
```

3.138.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.138.4 Maple [F]

$$\int x^2(ex+d)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^n\right)\right)dx$$

input
```
int(x^2*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^2*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

3.138.5 Fricas [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 496, normalized size of antiderivative = 2.33

$$\int x^2(d+ex)^{3/2}\,(a+b\log(cx^n))\,dx = \left[\frac{2\left(2520\,bd^{\frac{9}{2}}n\log\left(\frac{ex+2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)-(5228\,bd^4n-2520\,ad^4+1225\,(2\,be^4n-9\,ae^4)x^4\right.}{}\right.$$

$$-\frac{2\left(5040\,b\sqrt{-d}d^4n\arctan\left(\frac{\sqrt{ex+d}\sqrt{-d}}{d}\right)+(5228\,bd^4n-2520\,ad^4+1225\,(2\,be^4n-9\,ae^4)x^4+50\,(97\,bde^3n-\right.}{}$$

input
```
integrate(x^2*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[2/99225*(2520*b*d^(9/2)*n*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) -
(5228*b*d^4*n - 2520*a*d^4 + 1225*(2*b*e^4*n - 9*a*e^4)*x^4 + 50*(97*b*d*e
^3*n - 315*a*d*e^3)*x^3 + 3*(286*b*d^2*e^2*n - 315*a*d^2*e^2)*x^2 - 2*(677
*b*d^3*e*n - 630*a*d^3*e)*x - 315*(35*b*e^4*x^4 + 50*b*d*e^3*x^3 + 3*b*d^2
*e^2*x^2 - 4*b*d^3*e*x + 8*b*d^4)*log(c) - 315*(35*b*e^4*n*x^4 + 50*b*d*e^
3*n*x^3 + 3*b*d^2*e^2*n*x^2 - 4*b*d^3*e*n*x + 8*b*d^4*n)*log(x))*sqrt(e*x
+ d))/e^3, -2/99225*(5040*b*sqrt(-d)*d^4*n*arctan(sqrt(e*x + d)*sqrt(-d)/d
) + (5228*b*d^4*n - 2520*a*d^4 + 1225*(2*b*e^4*n - 9*a*e^4)*x^4 + 50*(97*b
*d*e^3*n - 315*a*d*e^3)*x^3 + 3*(286*b*d^2*e^2*n - 315*a*d^2*e^2)*x^2 - 2*
(677*b*d^3*e*n - 630*a*d^3*e)*x - 315*(35*b*e^4*x^4 + 50*b*d*e^3*x^3 + 3*b
*d^2*e^2*x^2 - 4*b*d^3*e*x + 8*b*d^4)*log(c) - 315*(35*b*e^4*n*x^4 + 50*b*
d*e^3*n*x^3 + 3*b*d^2*e^2*n*x^2 - 4*b*d^3*e*n*x + 8*b*d^4*n)*log(x))*sqrt(
e*x + d))/e^3]
```

3.138.6 Sympy [A] (verification not implemented)

Time = 129.07 (sec) , antiderivative size = 643, normalized size of antiderivative = 3.02

$$\int x^2(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx = ad\left(\begin{cases}\frac{2d^2(d+ex)^{\frac{3}{2}}}{3e^3}-\frac{4d(d+ex)^{\frac{5}{2}}}{5e^3}+\frac{2(d+ex)^{\frac{7}{2}}}{7e^3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^3}{3} & \text{otherwise}\end{cases}\right)$$

$$+ae\left(\begin{cases}-\frac{2d^3(d+ex)^{\frac{3}{2}}}{3e^4}+\frac{6d^2(d+ex)^{\frac{5}{2}}}{5e^4}-\frac{6d(d+ex)^{\frac{7}{2}}}{7e^4}+\frac{2(d+ex)^{\frac{9}{2}}}{9e^4} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^4}{4} & \text{otherwise}\end{cases}\right)$$

$$-bdn\left(\begin{cases}\frac{3112d^{\frac{7}{2}}\sqrt{1+\frac{ex}{d}}}{11025e^3}+\frac{16d^{\frac{7}{2}}\log\left(\frac{ex}{d}\right)}{105e^3}-\frac{32d^{\frac{7}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{105e^3}-\frac{716d^{\frac{5}{2}}x\sqrt{1+\frac{ex}{d}}}{11025e^2}+\frac{48d^{\frac{3}{2}}x^2\sqrt{1+\frac{ex}{d}}}{1225e}+\frac{4\sqrt{d}x^3\sqrt{1+\frac{ex}{d}}}{49} & \text{for } e\\ \frac{\sqrt{d}x^3}{9} & \text{other}\end{cases}\right.$$

$$+bd\left(\begin{cases}\frac{2d^2(d+ex)^{\frac{3}{2}}}{3e^3}-\frac{4d(d+ex)^{\frac{5}{2}}}{5e^3}+\frac{2(d+ex)^{\frac{7}{2}}}{7e^3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^3}{3} & \text{otherwise}\end{cases}\right)\log\left(cx^n\right)$$

$$-ben\left(\begin{cases}-\frac{17552d^{\frac{9}{2}}\sqrt{1+\frac{ex}{d}}}{99225e^4}-\frac{32d^{\frac{9}{2}}\log\left(\frac{ex}{d}\right)}{315e^4}+\frac{64d^{\frac{9}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{315e^4}+\frac{3736d^{\frac{7}{2}}x\sqrt{1+\frac{ex}{d}}}{99225e^3}-\frac{724d^{\frac{5}{2}}x^2\sqrt{1+\frac{ex}{d}}}{33075e^2}+\frac{64d^{\frac{3}{2}}x^3\sqrt{1+\frac{ex}{d}}}{3969e}+\\ \frac{\sqrt{d}x^4}{16}\end{cases}\right.$$

$$+be\left(\begin{cases}-\frac{2d^3(d+ex)^{\frac{3}{2}}}{3e^4}+\frac{6d^2(d+ex)^{\frac{5}{2}}}{5e^4}-\frac{6d(d+ex)^{\frac{7}{2}}}{7e^4}+\frac{2(d+ex)^{\frac{9}{2}}}{9e^4} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^4}{4} & \text{otherwise}\end{cases}\right)\log\left(cx^n\right)$$

input
```
integrate(x**2*(e*x+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*Piecewise((2*d**2*(d + e*x)**(3/2)/(3*e**3) - 4*d*(d + e*x)**(5/2)/(5*
e**3) + 2*(d + e*x)**(7/2)/(7*e**3), Ne(e, 0)), (sqrt(d)*x**3/3, True)) +
a*e*Piecewise((-2*d**3*(d + e*x)**(3/2)/(3*e**4) + 6*d**2*(d + e*x)**(5/2)
/(5*e**4) - 6*d*(d + e*x)**(7/2)/(7*e**4) + 2*(d + e*x)**(9/2)/(9*e**4), N
e(e, 0)), (sqrt(d)*x**4/4, True)) - b*d*n*Piecewise((3112*d**(7/2)*sqrt(1
+ e*x/d)/(11025*e**3) + 16*d**(7/2)*log(e*x/d)/(105*e**3) - 32*d**(7/2)*lo
g(sqrt(1 + e*x/d) + 1)/(105*e**3) - 716*d**(5/2)*x*sqrt(1 + e*x/d)/(11025*
e**2) + 48*d**(3/2)*x**2*sqrt(1 + e*x/d)/(1225*e) + 4*sqrt(d)*x**3*sqrt(1
+ e*x/d)/49, (e > -oo) & (e < oo) & Ne(e, 0)), (sqrt(d)*x**3/9, True)) + b
*d*Piecewise((2*d**2*(d + e*x)**(3/2)/(3*e**3) - 4*d*(d + e*x)**(5/2)/(5*e
**3) + 2*(d + e*x)**(7/2)/(7*e**3), Ne(e, 0)), (sqrt(d)*x**3/3, True))*log
(c*x**n) - b*e*n*Piecewise((-17552*d**(9/2)*sqrt(1 + e*x/d)/(99225*e**4) -
 32*d**(9/2)*log(e*x/d)/(315*e**4) + 64*d**(9/2)*log(sqrt(1 + e*x/d) + 1)/
(315*e**4) + 3736*d**(7/2)*x*sqrt(1 + e*x/d)/(99225*e**3) - 724*d**(5/2)*x
**2*sqrt(1 + e*x/d)/(33075*e**2) + 64*d**(3/2)*x**3*sqrt(1 + e*x/d)/(3969*
e) + 4*sqrt(d)*x**4*sqrt(1 + e*x/d)/81, (e > -oo) & (e < oo) & Ne(e, 0)),
(sqrt(d)*x**4/16, True)) + b*e*Piecewise((-2*d**3*(d + e*x)**(3/2)/(3*e**4
) + 6*d**2*(d + e*x)**(5/2)/(5*e**4) - 6*d*(d + e*x)**(7/2)/(7*e**4) + 2*(
d + e*x)**(9/2)/(9*e**4), Ne(e, 0)), (sqrt(d)*x**4/4, True))*log(c*x**n)
```

3.138.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 196, normalized size of antiderivative = 0.92

$$\int x^2(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx =$$

$$-\frac{4}{99225}\left(\frac{1260\,d^{\frac{9}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^3}+\frac{1225\,(ex+d)^{\frac{9}{2}}-2475\,(ex+d)^{\frac{7}{2}}d+504\,(ex+d)^{\frac{5}{2}}d^2+840\,(ex+d)^{\frac{3}{2}}}{e^3}\right.$$

$$+\frac{2}{315}\left(\frac{35\,(ex+d)^{\frac{9}{2}}}{e^3}-\frac{90\,(ex+d)^{\frac{7}{2}}d}{e^3}+\frac{63\,(ex+d)^{\frac{5}{2}}d^2}{e^3}\right)b\log\left(cx^n\right)$$

$$+\frac{2}{315}\left(\frac{35\,(ex+d)^{\frac{9}{2}}}{e^3}-\frac{90\,(ex+d)^{\frac{7}{2}}d}{e^3}+\frac{63\,(ex+d)^{\frac{5}{2}}d^2}{e^3}\right)a$$

input
```
integrate(x^2*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-4/99225*(1260*d^(9/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt
(d)))/e^3 + (1225*(e*x + d)^(9/2) - 2475*(e*x + d)^(7/2)*d + 504*(e*x + d)
^(5/2)*d^2 + 840*(e*x + d)^(3/2)*d^3 + 2520*sqrt(e*x + d)*d^4)/e^3)*b*n +
2/315*(35*(e*x + d)^(9/2)/e^3 - 90*(e*x + d)^(7/2)*d/e^3 + 63*(e*x + d)^(5
/2)*d^2/e^3)*b*log(c*x^n) + 2/315*(35*(e*x + d)^(9/2)/e^3 - 90*(e*x + d)^(
7/2)*d/e^3 + 63*(e*x + d)^(5/2)*d^2/e^3)*a
```

3.138.8 Giac [F]

$$\int x^2(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\int(ex+d)^{\frac{3}{2}}(b\log\left(cx^n\right)+a)x^2\,dx$$

input
```
integrate(x^2*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a)*x^2, x)
```

3.138.9 Mupad [F(-1)]

Timed out.

$$\int x^2(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,{\left(d+e\,x\right)}^{3/2}\,dx$$

input
```
int(x^2*(a + b*log(c*x^n))*(d + e*x)^(3/2),x)
```

output
```
int(x^2*(a + b*log(c*x^n))*(d + e*x)^(3/2), x)
```

3.139 $\int x(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx$

3.139.1 Optimal result

Integrand size = 21, antiderivative size = 163

$$\int x(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{8bd^3n\sqrt{d+ex}}{35e^2}+\frac{8bd^2n(d+ex)^{3/2}}{105e^2}+\frac{8bdn(d+ex)^{5/2}}{175e^2}-\frac{4bn(d+ex)^{7/2}}{49e^2}-\frac{8bd^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{35e^2}-\frac{2d(d+ex)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}+\frac{2(d+ex)^{7/2}\left(a+b\log\left(cx^n\right)\right)}{7e^2}$$

output
```
8/105*b*d^2*n*(e*x+d)^(3/2)/e^2+8/175*b*d*n*(e*x+d)^(5/2)/e^2-4/49*b*n*(e*
x+d)^(7/2)/e^2-8/35*b*d^(7/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^2-2/5*d*(
e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^2+2/7*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e^2+8/3
5*b*d^3*n*(e*x+d)^(1/2)/e^2
```

3.139.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 120, normalized size of antiderivative = 0.74

$$\int x(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{2\left(420bd^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}(105a(2d-5ex)(d+ex)^2+2bn(-247d^3+71d^2ex+183de^2x^2+\right.}{3675e^2}$$

input
```
Integrate[x*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-2*(420*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(105*a
*(2*d - 5*e*x)*(d + e*x)^2 + 2*b*n*(-247*d^3 + 71*d^2*e*x + 183*d*e^2*x^2
+ 75*e^3*x^3) + 105*b*(2*d - 5*e*x)*(d + e*x)^2*Log[c*x^n])))/(3675*e^2)
```

3.139.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 147, normalized size of antiderivative = 0.90, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.381$, Rules used = {2792, 27, 90, 60, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex)^{3/2} (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \ 2792$$

$$-bn\int -\frac{2(2d-5ex)(d+ex)^{5/2}}{35e^2x}dx+\frac{2(d+ex)^{7/2} (a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2} (a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \ 27$$

$$\frac{2bn\int \frac{(2d-5ex)(d+ex)^{5/2}}{x}dx}{35e^2}+\frac{2(d+ex)^{7/2} (a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2} (a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \ 90$$

$$\frac{2bn\left(2d\int \frac{(d+ex)^{5/2}}{x}dx-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^2}+\frac{2(d+ex)^{7/2} (a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2} (a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \ 60$$

$$\frac{2bn\left(2d\left(d\int \frac{(d+ex)^{3/2}}{x}dx+\frac{2}{5}(d+ex)^{5/2}\right)-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^2}+\frac{2(d+ex)^{7/2} (a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2} (a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \ 60$$

$$\frac{2bn\left(2d\left(d\left(d\int\frac{\sqrt{d+ex}}{x}dx+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^2}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \ 60$$

$$\frac{2bn\left(2d\left(d\left(d\left(d\int\frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^2}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \ 73$$

$$\frac{2bn\left(2d\left(d\left(d\left(\frac{2d\int\frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^2}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \ 221$$

$$\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{2d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^2}+\frac{2bn\left(2d\left(d\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^2}$$

input
```
Int[x*(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(2*b*n*((-10*(d + e*x)^(7/2))/7 + 2*d*((2*(d + e*x)^(5/2))/5 + d*((2*(d +
e*x)^(3/2))/3 + d*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[
d]])))))/(35*e^2) - (2*d*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^2) + (2*
(d + e*x)^(7/2)*(a + b*Log[c*x^n]))/(7*e^2)
```

3.139. $\int x(d+ex)^{3/2}(a+b\log(cx^n))\,dx$

3.139.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.139.4 Maple [F]

$$\int x(ex+d)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

input
```
int(x*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x*(e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

3.139.5 Fricas [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 391, normalized size of antiderivative = 2.40

$$\int x(d+ex)^{3/2}(a+b\log(cx^{n}))\,dx = \left[\frac{2\left(210\,bd^{\frac{7}{2}}n\log\left(\frac{ex-2\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(494\,bd^{3}n-210\,ad^{3}-75\,(2\,be^{3}n-7\,ae^{3})x^{3}-6\,(6\right.}{}\right.$$

input
```
integrate(x*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[2/3675*(210*b*d^(7/2)*n*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) + (4
94*b*d^3*n - 210*a*d^3 - 75*(2*b*e^3*n - 7*a*e^3)*x^3 - 6*(61*b*d*e^2*n -
140*a*d*e^2)*x^2 - (142*b*d^2*e*n - 105*a*d^2*e)*x + 105*(5*b*e^3*x^3 + 8*
b*d*e^2*x^2 + b*d^2*e*x - 2*b*d^3)*log(c) + 105*(5*b*e^3*n*x^3 + 8*b*d*e^2
*n*x^2 + b*d^2*e*n*x - 2*b*d^3*n)*log(x))*sqrt(e*x + d))/e^2, 2/3675*(420*
b*sqrt(-d)*d^3*n*arctan(sqrt(e*x + d)*sqrt(-d)/d) + (494*b*d^3*n - 210*a*d
^3 - 75*(2*b*e^3*n - 7*a*e^3)*x^3 - 6*(61*b*d*e^2*n - 140*a*d*e^2)*x^2 - (
142*b*d^2*e*n - 105*a*d^2*e)*x + 105*(5*b*e^3*x^3 + 8*b*d*e^2*x^2 + b*d^2*
e*x - 2*b*d^3)*log(c) + 105*(5*b*e^3*n*x^3 + 8*b*d*e^2*n*x^2 + b*d^2*e*n*x
 - 2*b*d^3*n)*log(x))*sqrt(e*x + d))/e^2]
```

3.139.6 Sympy [A] (verification not implemented)

Time = 113.00 (sec) , antiderivative size = 517, normalized size of antiderivative = 3.17

$$\int x(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx = ad\left(\begin{cases} -\frac{2d(d+ex)^{\frac{3}{2}}}{3e^2}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^2} & \text{for } e\neq 0 \\ \frac{\sqrt{d}x^2}{2} & \text{otherwise} \end{cases}\right)$$

$$+ae\left(\begin{cases} \frac{2d^2(d+ex)^{\frac{3}{2}}}{3e^3}-\frac{4d(d+ex)^{\frac{5}{2}}}{5e^3}+\frac{2(d+ex)^{\frac{7}{2}}}{7e^3} & \text{for } e\neq 0 \\ \frac{\sqrt{d}x^3}{3} & \text{otherwise} \end{cases}\right)$$

$$-bdn\left(\begin{cases} -\frac{124d^{\frac{5}{2}}\sqrt{1+\frac{ex}{d}}}{225e^2}-\frac{4d^{\frac{5}{2}}\log\left(\frac{ex}{d}\right)}{15e^2}+\frac{8d^{\frac{5}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{15e^2}+\frac{32d^{\frac{3}{2}}x\sqrt{1+\frac{ex}{d}}}{225e}+\frac{4\sqrt{d}x^2\sqrt{1+\frac{ex}{d}}}{25} & \text{for } e>-\infty\wedge e<\infty \\ \frac{\sqrt{d}x^2}{4} & \text{otherwise} \end{cases}\right.$$

$$+bd\left(\begin{cases} -\frac{2d(d+ex)^{\frac{3}{2}}}{3e^2}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^2} & \text{for } e\neq 0 \\ \frac{\sqrt{d}x^2}{2} & \text{otherwise} \end{cases}\right)\log\left(cx^n\right)$$

$$-ben\left(\begin{cases} \frac{3112d^{\frac{7}{2}}\sqrt{1+\frac{ex}{d}}}{11025e^3}+\frac{16d^{\frac{7}{2}}\log\left(\frac{ex}{d}\right)}{105e^3}-\frac{32d^{\frac{7}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{105e^3}-\frac{716d^{\frac{5}{2}}x\sqrt{1+\frac{ex}{d}}}{11025e^2}+\frac{48d^{\frac{3}{2}}x^2\sqrt{1+\frac{ex}{d}}}{1225e}+\frac{4\sqrt{d}x^3\sqrt{1+\frac{ex}{d}}}{49} & \text{for } e \\ \frac{\sqrt{d}x^3}{9} & \text{other} \end{cases}\right.$$

$$+be\left(\begin{cases} \frac{2d^2(d+ex)^{\frac{3}{2}}}{3e^3}-\frac{4d(d+ex)^{\frac{5}{2}}}{5e^3}+\frac{2(d+ex)^{\frac{7}{2}}}{7e^3} & \text{for } e\neq 0 \\ \frac{\sqrt{d}x^3}{3} & \text{otherwise} \end{cases}\right)\log\left(cx^n\right)$$

input
```
integrate(x*(e*x+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*Piecewise((-2*d*(d + e*x)**(3/2)/(3*e**2) + 2*(d + e*x)**(5/2)/(5*e**2
), Ne(e, 0)), (sqrt(d)*x**2/2, True)) + a*e*Piecewise((2*d**2*(d + e*x)**(
3/2)/(3*e**3) - 4*d*(d + e*x)**(5/2)/(5*e**3) + 2*(d + e*x)**(7/2)/(7*e**3
), Ne(e, 0)), (sqrt(d)*x**3/3, True)) - b*d*n*Piecewise((-124*d**(5/2)*sqr
t(1 + e*x/d)/(225*e**2) - 4*d**(5/2)*log(e*x/d)/(15*e**2) + 8*d**(5/2)*log
(sqrt(1 + e*x/d) + 1)/(15*e**2) + 32*d**(3/2)*x*sqrt(1 + e*x/d)/(225*e) +
4*sqrt(d)*x**2*sqrt(1 + e*x/d)/25, (e > -oo) & (e < oo) & Ne(e, 0)), (sqrt
(d)*x**2/4, True)) + b*d*Piecewise((-2*d*(d + e*x)**(3/2)/(3*e**2) + 2*(d
+ e*x)**(5/2)/(5*e**2), Ne(e, 0)), (sqrt(d)*x**2/2, True))*log(c*x**n) - b
*e*n*Piecewise((3112*d**(7/2)*sqrt(1 + e*x/d)/(11025*e**3) + 16*d**(7/2)*l
og(e*x/d)/(105*e**3) - 32*d**(7/2)*log(sqrt(1 + e*x/d) + 1)/(105*e**3) - 7
16*d**(5/2)*x*sqrt(1 + e*x/d)/(11025*e**2) + 48*d**(3/2)*x**2*sqrt(1 + e*x
/d)/(1225*e) + 4*sqrt(d)*x**3*sqrt(1 + e*x/d)/49, (e > -oo) & (e < oo) & N
e(e, 0)), (sqrt(d)*x**3/9, True)) + b*e*Piecewise((2*d**2*(d + e*x)**(3/2)
/(3*e**3) - 4*d*(d + e*x)**(5/2)/(5*e**3) + 2*(d + e*x)**(7/2)/(7*e**3), N
e(e, 0)), (sqrt(d)*x**3/3, True))*log(c*x**n)
```

3.139.7 Maxima [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 155, normalized size of antiderivative = 0.95

$$\int x(d+ex)^{3/2}(a+b\log(cx^n))\,dx = \frac{4}{3675}\left(\frac{105\,d^{\frac{7}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^2} - \frac{75\,(ex+d)^{\frac{7}{2}} - 42\,(ex+d)^{\frac{5}{2}}d - 70\,(ex+d)^{\frac{3}{2}}d^2 - 210\sqrt{\ldots}}{e^2}\right. + \frac{2}{35}\left(\frac{5\,(ex+d)^{\frac{7}{2}}}{e^2} - \frac{7\,(ex+d)^{\frac{5}{2}}d}{e^2}\right)b\log(cx^n) + \frac{2}{35}\left(\frac{5\,(ex+d)^{\frac{7}{2}}}{e^2} - \frac{7\,(ex+d)^{\frac{5}{2}}d}{e^2}\right)a$$

input
```
integrate(x*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
4/3675*(105*d^(7/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)
))/e^2 - (75*(e*x + d)^(7/2) - 42*(e*x + d)^(5/2)*d - 70*(e*x + d)^(3/2)*d
^2 - 210*sqrt(e*x + d)*d^3)/e^2)*b*n + 2/35*(5*(e*x + d)^(7/2)/e^2 - 7*(e*
x + d)^(5/2)*d/e^2)*b*log(c*x^n) + 2/35*(5*(e*x + d)^(7/2)/e^2 - 7*(e*x +
d)^(5/2)*d/e^2)*a
```

3.139.8 Giac [F]

$$\int x(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\int(ex+d)^{\frac{3}{2}}(b\log\left(cx^n\right)+a)x\,dx$$

input
```
integrate(x*(e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a)*x, x)
```

3.139.9 Mupad [F(-1)]

Timed out.

$$\int x(d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\int x\left(a+b\,\ln\left(c\,x^n\right)\right)\left(d+e\,x\right)^{3/2}\,dx$$

input
```
int(x*(a + b*log(c*x^n))*(d + e*x)^(3/2),x)
```

output
```
int(x*(a + b*log(c*x^n))*(d + e*x)^(3/2), x)
```

3.140 $\int (d+ex)^{3/2} (a+b\log(cx^n))\, dx$

3.140.1 Optimal result

Integrand size = 20, antiderivative size = 115

$$\int (d+ex)^{3/2} (a+b\log(cx^n))\, dx = -\frac{4bd^2n\sqrt{d+ex}}{5e}-\frac{4bdn(d+ex)^{3/2}}{15e} -\frac{4bn(d+ex)^{5/2}}{25e}+\frac{4bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{5e}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e}$$

output
```
-4/15*b*d*n*(e*x+d)^(3/2)/e-4/25*b*n*(e*x+d)^(5/2)/e+4/5*b*d^(5/2)*n*arcta
nh((e*x+d)^(1/2)/d^(1/2))/e+2/5*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e-4/5*b*d^2*
n*(e*x+d)^(1/2)/e
```

3.140.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 87, normalized size of antiderivative = 0.76

$$\int (d+ex)^{3/2} (a +b\log(cx^n))\, dx = \frac{2\left(-\frac{2}{15}bn\sqrt{d+ex}(23d^2+11dex+3e^2x^2)+2bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+(d+ex)^{5/2}(a+b\right.}{5e}$$

input
```
Integrate[(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(2*((-2*b*n*Sqrt[d + e*x]*(23*d^2 + 11*d*e*x + 3*e^2*x^2))/15 + 2*b*d^(5/2
)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + (d + e*x)^(5/2)*(a + b*Log[c*x^n])))/
(5*e)
```

3.140.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 103, normalized size of antiderivative = 0.90, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.300, Rules used = {2756, 60, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^{3/2} (a+b\log (cx^n)) \, dx$$

$$\Big\downarrow \; 2756$$

$$\frac{2(d+ex)^{5/2} (a+b\log (cx^n))}{5e}-\frac{2bn\int \frac{(d+ex)^{5/2}}{x}dx}{5e}$$

$$\Big\downarrow \; 60$$

$$\frac{2(d+ex)^{5/2} (a+b\log (cx^n))}{5e}-\frac{2bn\left(d\int \frac{(d+ex)^{3/2}}{x}dx+\frac{2}{5}(d+ex)^{5/2}\right)}{5e}$$

$$\Big\downarrow \; 60$$

$$\frac{2(d+ex)^{5/2} (a+b\log (cx^n))}{5e}-\frac{2bn\left(d\left(d\int \frac{\sqrt{d+ex}}{x}dx+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)}{5e}$$

$$\Big\downarrow \; 60$$

$$\frac{2(d+ex)^{5/2} (a+b\log (cx^n))}{5e}-\frac{2bn\left(d\left(d\left(d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)}{5e}$$

$$\Big\downarrow \; 73$$

$$\frac{2(d+ex)^{5/2} (a+b\log (cx^n))}{5e}-\frac{2bn\left(d\left(d\left(\frac{2d\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)}{5e}$$

$$\Big\downarrow \; 221$$

$$\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e} - \frac{2bn\left(d\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)+\frac{2}{5}(d+ex)^{5/2}\right)}{5e}$$

input
```
Int[(d + e*x)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-2*b*n*((2*(d + e*x)^(5/2))/5 + d*((2*(d + e*x)^(3/2))/3 + d*(2*Sqrt[d +
e*x] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))))/(5*e) + (2*(d + e*x)^(
5/2)*(a + b*Log[c*x^n]))/(5*e)
```

3.140.3.1 Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

3.140.4 Maple [F]

$$\int (ex+d)^{\frac{3}{2}} (a+b\ln (c\,x^{n}))\,dx$$

input
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

3.140.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 288, normalized size of antiderivative = 2.50

$$\int (d+ex)^{3/2} (a+b\log (cx^n))\ dx = \left[\frac{2\left(15\,bd^{\frac{5}{2}}n\log\left(\frac{ex+2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)-(46\,bd^2n-15\,ad^2+3\,(2\,be^2n-5\,ae^2)x^2+2\,(11\,bde\right.}{} \right.$$

$$-\frac{2\left(30\,b\sqrt{-d}d^2n\arctan\left(\frac{\sqrt{ex+d}\sqrt{-d}}{d}\right)+(46\,bd^2n-15\,ad^2+3\,(2\,be^2n-5\,ae^2)x^2+2\,(11\,bden-15\,ade)x-\right.}{75\,e}$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[2/75*(15*b*d^(5/2)*n*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) - (46*b
*d^2*n - 15*a*d^2 + 3*(2*b*e^2*n - 5*a*e^2)*x^2 + 2*(11*b*d*e*n - 15*a*d*e
)*x - 15*(b*e^2*x^2 + 2*b*d*e*x + b*d^2)*log(c) - 15*(b*e^2*n*x^2 + 2*b*d*
e*n*x + b*d^2*n)*log(x))*sqrt(e*x + d))/e, -2/75*(30*b*sqrt(-d)*d^2*n*arct
an(sqrt(e*x + d)*sqrt(-d)/d) + (46*b*d^2*n - 15*a*d^2 + 3*(2*b*e^2*n - 5*a
*e^2)*x^2 + 2*(11*b*d*e*n - 15*a*d*e)*x - 15*(b*e^2*x^2 + 2*b*d*e*x + b*d^
2)*log(c) - 15*(b*e^2*n*x^2 + 2*b*d*e*n*x + b*d^2*n)*log(x))*sqrt(e*x + d)
)/e]
```

3.140.6 Sympy [A] (verification not implemented)

Time = 88.80 (sec) , antiderivative size = 377, normalized size of antiderivative = 3.28

$$\int (d+ex)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx = ad\left(\begin{cases} \frac{2(d+ex)^{\frac{3}{2}}}{3e} & \text{for } e\neq 0 \\ \sqrt{d}x & \text{otherwise} \end{cases}\right)$$
$$+ae\left(\begin{cases} -\frac{2d(d+ex)^{\frac{3}{2}}}{3e^2}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^2} & \text{for } e\neq 0 \\ \frac{\sqrt{d}x^2}{2} & \text{otherwise} \end{cases}\right)$$
$$-bdn\left(\begin{cases} \frac{16d^{\frac{3}{2}}\sqrt{1+\frac{ex}{d}}}{9e}+\frac{2d^{\frac{3}{2}}\log\left(\frac{ex}{d}\right)}{3e}-\frac{4d^{\frac{3}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{3e}+\frac{4\sqrt{d}x\sqrt{1+\frac{ex}{d}}}{9} & \text{for } e>-\infty\wedge e<\infty\wedge e\neq 0 \\ \sqrt{d}x & \text{otherwise} \end{cases}\right)$$
$$+bd\left(\begin{cases} \frac{2(d+ex)^{\frac{3}{2}}}{3e} & \text{for } e\neq 0 \\ \sqrt{d}x & \text{otherwise} \end{cases}\right)\log\left(cx^n\right)$$
$$-ben\left(\begin{cases} -\frac{124d^{\frac{5}{2}}\sqrt{1+\frac{ex}{d}}}{225e^2}-\frac{4d^{\frac{5}{2}}\log\left(\frac{ex}{d}\right)}{15e^2}+\frac{8d^{\frac{5}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{15e^2}+\frac{32d^{\frac{3}{2}}x\sqrt{1+\frac{ex}{d}}}{225e}+\frac{4\sqrt{d}x^2\sqrt{1+\frac{ex}{d}}}{25} & \text{for } e>-\infty\wedge e<\infty \\ \frac{\sqrt{d}x^2}{4} & \text{otherwise} \end{cases}\right.$$
$$+be\left(\begin{cases} -\frac{2d(d+ex)^{\frac{3}{2}}}{3e^2}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^2} & \text{for } e\neq 0 \\ \frac{\sqrt{d}x^2}{2} & \text{otherwise} \end{cases}\right)\log\left(cx^n\right)$$

input
```
integrate((e*x+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*Piecewise((2*(d + e*x)**(3/2)/(3*e), Ne(e, 0)), (sqrt(d)*x, True)) + a
*e*Piecewise((-2*d*(d + e*x)**(3/2)/(3*e**2) + 2*(d + e*x)**(5/2)/(5*e**2)
, Ne(e, 0)), (sqrt(d)*x**2/2, True)) - b*d*n*Piecewise((16*d**(3/2)*sqrt(1
 + e*x/d)/(9*e) + 2*d**(3/2)*log(e*x/d)/(3*e) - 4*d**(3/2)*log(sqrt(1 + e*
x/d) + 1)/(3*e) + 4*sqrt(d)*x*sqrt(1 + e*x/d)/9, (e > -oo) & (e < oo) & Ne
(e, 0)), (sqrt(d)*x, True)) + b*d*Piecewise((2*(d + e*x)**(3/2)/(3*e), Ne(
e, 0)), (sqrt(d)*x, True))*log(c*x**n) - b*e*n*Piecewise((-124*d**(5/2)*sq
rt(1 + e*x/d)/(225*e**2) - 4*d**(5/2)*log(e*x/d)/(15*e**2) + 8*d**(5/2)*lo
g(sqrt(1 + e*x/d) + 1)/(15*e**2) + 32*d**(3/2)*x*sqrt(1 + e*x/d)/(225*e) +
 4*sqrt(d)*x**2*sqrt(1 + e*x/d)/25, (e > -oo) & (e < oo) & Ne(e, 0)), (sqr
t(d)*x**2/4, True)) + b*e*Piecewise((-2*d*(d + e*x)**(3/2)/(3*e**2) + 2*(d
 + e*x)**(5/2)/(5*e**2), Ne(e, 0)), (sqrt(d)*x**2/2, True))*log(c*x**n)
```

3.140.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 105, normalized size of antiderivative = 0.91

$$\int (d+ex)^{3/2}(a+b\log(cx^n))\,dx = \frac{2(ex+d)^{\frac{5}{2}}b\log(cx^n)}{5e} + \frac{2(ex+d)^{\frac{5}{2}}a}{5e} - \frac{2\left(15d^{\frac{5}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)+6(ex+d)^{\frac{5}{2}}+10(ex+d)^{\frac{3}{2}}d+30\sqrt{ex+d}d^2\right)bn}{75e}$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
2/5*(e*x + d)^(5/2)*b*log(c*x^n)/e + 2/5*(e*x + d)^(5/2)*a/e - 2/75*(15*d^
(5/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d))) + 6*(e*x +
d)^(5/2) + 10*(e*x + d)^(3/2)*d + 30*sqrt(e*x + d)*d^2)*b*n/e
```

3.140.8 Giac [F]

$$\int (d+ex)^{3/2}(a+b\log(cx^n))\,dx = \int (ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a), x)
```

3.140.9 Mupad [F(-1)]

Timed out.

$$\int (d+ex)^{3/2}(a+b\log(cx^n))\,dx = \int (a+b\ln(c\,x^n))\,(d+e\,x)^{3/2}\,dx$$

input
```
int((a + b*log(c*x^n))*(d + e*x)^(3/2),x)
```

output
```
int((a + b*log(c*x^n))*(d + e*x)^(3/2), x)
```

3.141 $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx$

3.141.1 Optimal result

Integrand size = 23, antiderivative size = 255

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx = -\frac{16}{3}bdn\sqrt{d+ex}-\frac{4}{9}bn(d+ex)^{3/2} +\frac{16}{3}bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2+2d\sqrt{d+ex}(a+b\log(cx^n))+\frac{2}{3}(d+ex)^{3/2}(a$$

output
```
-4/9*b*n*(e*x+d)^(3/2)+16/3*b*d^(3/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))+2*b
*d^(3/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))^2+2/3*(e*x+d)^(3/2)*(a+b*ln(c*x^
n))-2*d^(3/2)*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))-4*b*d^(3/2)*n
*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))-2*b*
d^(3/2)*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))-16/3*b*d*n*(e*x+d
)^(1/2)+2*d*(a+b*ln(c*x^n))*(e*x+d)^(1/2)
```

3.141.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 391, normalized size of antiderivative = 1.53

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx = 2ad\sqrt{d+ex}-4bdn\sqrt{d+ex} -\frac{4}{9}bn\sqrt{d+ex}(4d+ex)+\frac{16}{3}bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2bd\sqrt{d+ex}\log(cx^n) +\frac{2}{3}(d+ex)^{3/2}(a+b\log(cx^n))+d^{3/2}(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right)-d^{3/2}(a+b\log(cx^n))\log\left(\sqrt{d}+\sqrt{d-}\right.$$

input
```
Integrate[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
2*a*d*Sqrt[d + e*x] - 4*b*d*n*Sqrt[d + e*x] - (4*b*n*Sqrt[d + e*x]*(4*d +
e*x))/9 + (16*b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/3 + 2*b*d*Sqrt[d
 + e*x]*Log[c*x^n] + (2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/3 + d^(3/2)*(a
 + b*Log[c*x^n])*Log[Sqrt[d] - Sqrt[d + e*x]] - d^(3/2)*(a + b*Log[c*x^n])
*Log[Sqrt[d] + Sqrt[d + e*x]] + (b*d^(3/2)*n*Log[Sqrt[d] + Sqrt[d + e*x]]*
(Log[Sqrt[d] + Sqrt[d + e*x]] + 2*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])]))/2
 - (b*d^(3/2)*n*Log[Sqrt[d] - Sqrt[d + e*x]]*(Log[Sqrt[d] - Sqrt[d + e*x]]
 + 2*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2]))/2 - b*d^(3/2)*n*PolyLog[2, 1/2 -
 Sqrt[d + e*x]/(2*Sqrt[d])] + b*d^(3/2)*n*PolyLog[2, (1 + Sqrt[d + e*x]/Sq
rt[d])/2]
```

3.141.3 Rubi [A] (verified)

Time = 1.45 (sec) , antiderivative size = 309, normalized size of antiderivative = 1.21, number of steps used = 22, number of rules used = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.913$, Rules used = {2788, 2756, 60, 60, 73, 221, 2788, 2756, 60, 73, 221, 2790, 27, 7267, 25, 6546, 27, 6470, 27, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \text{2788}$$

$$e\int \sqrt{d+ex}(a+b\log(cx^n))dx+d\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \text{2756}$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\int \frac{(d+ex)^{3/2}}{x}dx}{3e}\right)+d\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \text{60}$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\int \frac{\sqrt{d+ex}}{x}dx+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)+ d\int \frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \; 60$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(d\int\frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)+d\int\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \; 73$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(\frac{2d\int\frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)+d\int\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \; 221$$

$$d\int\frac{\sqrt{d+ex}(a+b\log(cx^n))}{x}dx+e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\Big\downarrow \; 2788$$

$$d\left(e\int\frac{a+b\log(cx^n)}{\sqrt{d+ex}}dx+d\int\frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx\right)+e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\Big\downarrow \; 2756$$

$$d\left(e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\int\frac{\sqrt{d+ex}}{x}dx}{e}\right)+d\int\frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx\right)+e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\Big\downarrow \; 60$$

$$d\left(e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(d\int\frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)}{e}\right)+d\int\frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx\right)+e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

3.141. $\int\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}dx$

$$\Big\downarrow \text{73}$$

$$d\left(e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(\frac{2d\int\frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)}{e}\right)+d\int\frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx\right)+$$
$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\Big\downarrow \text{221}$$

$$d\left(d\int\frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}\right)\right)+$$
$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\Big\downarrow \text{2790}$$

$$d\left(d\left(-bn\int-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}x}dx-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2\right.$$
$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\Big\downarrow \text{27}$$

$$d\left(d\left(\frac{2bn\int\frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\right.$$
$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\Big\downarrow \text{7267}$$

3.141. $\int\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx$

$$d\left(d\left(\frac{4bn\int \frac{\sqrt{d+ex}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log(cx\right.\right.$$
$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$\downarrow$ 25

$$d\left(d\left(\frac{-4bn\int -\frac{\sqrt{d+ex}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(\frac{2\sqrt{d+ex}(a+b\log}{e}\right.\right.$$
$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$\downarrow$ 6546

$$d\left(d\left(\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\frac{\int \frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(2\sqrt{\right.\right.$$
$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$\downarrow$ 27

$$d\left(d\left(\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\int \frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}\right)+e\left(2\sqrt{\right.\right.$$
$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$\downarrow$ 6470

3.141. $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx$

$$d\left(d\left(\frac{4bn\left(\frac{\int -\frac{d\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\sqrt{\right.}}{}\right.\right.$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\Big\downarrow \; 27$$

$$d\left(d\left(\frac{4bn\left(\sqrt{d}\int -\frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arcta}}{}\right.\right.$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\Big\downarrow \; 2849$$

$$d\left(d\left(\frac{4bn\left(-\sqrt{d}\int \frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}}d\frac{1}{\sqrt{d}-\sqrt{d+ex}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arc}}{}\right.\right.$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

$$\Big\downarrow \; 2752$$

$$d\left(d\left(\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctan}}{}\right.\right.$$

$$e\left(\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e}-\frac{2bn\left(d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex)^{3/2}\right)}{3e}\right)$$

input
```
Int[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

3.141. $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx$

output
```
e*((-2*b*n*((2*(d + e*x)^(3/2))/3 + d*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh
[Sqrt[d + e*x]/Sqrt[d]])))/(3*e) + (2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/
(3*e)) + d*(e*((-2*b*n*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/
Sqrt[d]]))/e + (2*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e) + d*((-2*ArcTanh[Sq
rt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[d] + (4*b*n*(ArcTanh[Sqrt[d
+ e*x]/Sqrt[d]]^2/2 - ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt
[d] - Sqrt[d + e*x])] - PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x
])]/2))/Sqrt[d]))
```

3.141.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

3.141. $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx$

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2788
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.))
/(x_), x_Symbol] :> Simp[d   Int[(d + e*x)^(q - 1)*((a + b*Log[c*x^n])^p/x)
, x], x] + Simp[e   Int[(d + e*x)^(q - 1)*(a + b*Log[c*x^n])^p, x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && GtQ[q, 0] && IntegerQ[2*q]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

3.141. $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx$

3.141.4 Maple [F]

$$\int \frac{(ex+d)^{\frac{3}{2}} (a+b\ln (c\,x^{n}))}{x}dx$$

input
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

output
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

3.141.5 Fricas [F]

$$\int \frac{(d+ex)^{3/2} (a+b\log (cx^{n}))}{x}\,dx = \int \frac{(ex+d)^{\frac{3}{2}}(b\log (cx^{n})+a)}{x}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
integral(((b*e*x + b*d)*sqrt(e*x + d)*log(c*x^n) + (a*e*x + a*d)*sqrt(e*x
+ d))/x, x)
```

3.141.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex)^{3/2} (a+b\log (cx^{n}))}{x}\,dx = \text{Timed out}$$

input
```
integrate((e*x+d)**(3/2)*(a+b*ln(c*x**n))/x,x)
```

output
```
Timed out
```

3.141.7 Maxima [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/3*(3*d^(3/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d))) +
2*(e*x + d)^(3/2) + 6*sqrt(e*x + d)*d)*a + b*integrate((e*x*log(c) + d*log
(c) + (e*x + d)*log(x^n))*sqrt(e*x + d)/x, x)
```

3.141.8 Giac [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a)/x, x)
```

3.141.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(a+b\,\ln(c\,x^n))\,(d+e\,x)^{3/2}}{x}\,dx$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x,x)
```

output
```
int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x, x)
```

3.142 $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx$

3.142.1 Optimal result

Integrand size = 23, antiderivative size = 259

$$\begin{aligned}\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx &= -4ben\sqrt{d+ex}-\frac{bdn\sqrt{d+ex}}{x}\\ &+3b\sqrt{d}en\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+3b\sqrt{d}en\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2\\ &+3e\sqrt{d+ex}(a+b\log(cx^n))-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}\\ &-3\sqrt{d}e\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))\\ &-6b\sqrt{d}en\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\\ &-3b\sqrt{d}en\,\mathrm{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\end{aligned}$$

output

```
-(e*x+d)^(3/2)*(a+b*ln(c*x^n))/x+3*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))*d^
(1/2)+3*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))^2*d^(1/2)-3*e*arctanh((e*x+d)
^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*d^(1/2)-6*b*e*n*arctanh((e*x+d)^(1/2)/d^(1
/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))*d^(1/2)-3*b*e*n*polylog(2,1-2*d
^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))*d^(1/2)-4*b*e*n*(e*x+d)^(1/2)-b*d*n*(e*x+d
)^(1/2)/x+3*e*(a+b*ln(c*x^n))*(e*x+d)^(1/2)
```

3.142.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 480, normalized size of antiderivative = 1.85

$$\int \frac{(d+ex)^{3/2}\,(a+b\log(cx^n))}{x^2}\,dx = \frac{-4ad\sqrt{d+ex}-4bdn\sqrt{d+ex}+8aex\sqrt{d+ex}-16benx\sqrt{d+ex}+12$$

input
```
Integrate[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
(-4*a*d*Sqrt[d + e*x] - 4*b*d*n*Sqrt[d + e*x] + 8*a*e*x*Sqrt[d + e*x] - 16
*b*e*n*x*Sqrt[d + e*x] + 12*b*Sqrt[d]*e*n*x*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]
 - 4*b*d*Sqrt[d + e*x]*Log[c*x^n] + 8*b*e*x*Sqrt[d + e*x]*Log[c*x^n] + 6*a
*Sqrt[d]*e*x*Log[Sqrt[d] - Sqrt[d + e*x]] + 6*b*Sqrt[d]*e*x*Log[c*x^n]*Log
[Sqrt[d] - Sqrt[d + e*x]] - 3*b*Sqrt[d]*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]
^2 - 6*a*Sqrt[d]*e*x*Log[Sqrt[d] + Sqrt[d + e*x]] - 6*b*Sqrt[d]*e*x*Log[c*
x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] + 3*b*Sqrt[d]*e*n*x*Log[Sqrt[d] + Sqrt[d
 + e*x]]^2 + 6*b*Sqrt[d]*e*n*x*Log[Sqrt[d] + Sqrt[d + e*x]]*Log[1/2 - Sqrt
[d + e*x]/(2*Sqrt[d])] - 6*b*Sqrt[d]*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]*Lo
g[(1 + Sqrt[d + e*x]/Sqrt[d])/2] - 6*b*Sqrt[d]*e*n*x*PolyLog[2, 1/2 - Sqrt
[d + e*x]/(2*Sqrt[d])] + 6*b*Sqrt[d]*e*n*x*PolyLog[2, (1 + Sqrt[d + e*x]/S
qrt[d])/2])/(4*x)
```

3.142.3 Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 251, normalized size of antiderivative = 0.97, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2792, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^{3/2}\,(a+b\log(cx^n))}{x^2}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{\sqrt{d+ex}(d-2ex)+3\sqrt{d}ex\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x^2}dx - 3\sqrt{d}e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n)) - \frac{(d+ex)^{3/2}\,(a+b\log(cx^n))}{x} + 3e\sqrt{d+ex}(a+b\log(cx^n))$$

$$\Big\downarrow \; 25$$

$$bn\int \frac{\sqrt{d+ex}(d-2ex)+3\sqrt{d}ex\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x^2}dx-3\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}+3e\sqrt{d+ex}(a+b\log(cx^n))$$

$$\Big\downarrow \; 2010$$

$$bn\int\left(\frac{\sqrt{d+ex}d}{x^2}+\frac{3e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\sqrt{d}}{x}-\frac{2e\sqrt{d+ex}}{x}\right)dx-3\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}+3e\sqrt{d+ex}(a+b\log(cx^n))$$

$$\Big\downarrow \; 2009$$

$$-3\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x}+3e\sqrt{d+ex}(a+b\log(cx^n))+bn\left(3\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2+3\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)-6\sqrt{d}e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\right.$$

input
```
Int[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
3*e*Sqrt[d + e*x]*(a + b*Log[c*x^n]) - ((d + e*x)^(3/2)*(a + b*Log[c*x^n])
)/x - 3*Sqrt[d]*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]) + b*n*
(-4*e*Sqrt[d + e*x] - (d*Sqrt[d + e*x])/x + 3*Sqrt[d]*e*ArcTanh[Sqrt[d + e
*x]/Sqrt[d]] + 3*Sqrt[d]*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2 - 6*Sqrt[d]*e*
ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])]
- 3*Sqrt[d]*e*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])
```

3.142.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.142.4 Maple [F]

$$\int \frac{(ex+d)^{\frac{3}{2}} (a+b\ln (c\,x^{n}))}{x^{2}}dx$$

input
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^2,x)
```

output
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^2,x)
```

3.142.5 Fricas [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log (cx^n))}{x^2}\,dx = \int \frac{(ex+d)^{\frac{3}{2}}(b\log (cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
integral(((b*e*x + b*d)*sqrt(e*x + d)*log(c*x^n) + (a*e*x + a*d)*sqrt(e*x
+ d))/x^2, x)
```

3.142.6 Sympy [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx=\int \frac{(a+b\log(cx^n))(d+ex)^{\frac{3}{2}}}{x^2}\,dx$$

input
```
integrate((e*x+d)**(3/2)*(a+b*ln(c*x**n))/x**2,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x)**(3/2)/x**2, x)
```

3.142.7 Maxima [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx=\int \frac{(ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
1/2*(3*sqrt(d)*e*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))
+ 4*sqrt(e*x + d)*e - 2*sqrt(e*x + d)*d/x)*a + b*integrate((e*x*log(c) + d
*log(c) + (e*x + d)*log(x^n))*sqrt(e*x + d)/x^2, x)
```

3.142.8 Giac [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^2}\,dx=\int \frac{(ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a)/x^2, x)
```

3.142.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex)^{3/2} (a+b\log(cx^n))}{x^2} \, dx = \int \frac{(a+b\,\ln(c\,x^n))\,\left(d+e\,x\right)^{3/2}}{x^2} \, dx$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x^2,x)
```

output
```
int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x^2, x)
```

3.143 $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx$

3.143.1 Optimal result

Integrand size = 23, antiderivative size = 293

$$\begin{aligned}\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx &= -\frac{bdn\sqrt{d+ex}}{4x^2}-\frac{11ben\sqrt{d+ex}}{8x} \\ &\quad -\frac{9be^2n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8\sqrt{d}}+\frac{3be^2n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4\sqrt{d}}-\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4x} \\ &\quad -\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2}-\frac{3e^2\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4\sqrt{d}} \\ &\quad -\frac{3be^2n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{2\sqrt{d}}-\frac{3be^2n\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{4\sqrt{d}}\end{aligned}$$

output
```
-1/2*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^2-9/8*b*e^2*n*arctanh((e*x+d)^(1/2)/d
^(1/2))/d^(1/2)+3/4*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))^2/d^(1/2)-3/4*e
^2*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)-3/2*b*e^2*n*arct
anh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(1/2)-3
/4*b*e^2*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(1/2)-1/4*b*d*
n*(e*x+d)^(1/2)/x^2-11/8*b*e*n*(e*x+d)^(1/2)/x-3/4*e*(a+b*ln(c*x^n))*(e*x+
d)^(1/2)/x
```

3.143.2 Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 501, normalized size of antiderivative = 1.71

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx =$$
$$-\frac{8ad^{3/2}\sqrt{d+ex}+4bd^{3/2}n\sqrt{d+ex}+20a\sqrt{d}ex\sqrt{d+ex}+22b\sqrt{d}enx\sqrt{d+ex}+18be^2nx^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{}$$

input
```
Integrate[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/16*(8*a*d^(3/2)*Sqrt[d + e*x] + 4*b*d^(3/2)*n*Sqrt[d + e*x] + 20*a*Sqrt
[d]*e*x*Sqrt[d + e*x] + 22*b*Sqrt[d]*e*n*x*Sqrt[d + e*x] + 18*b*e^2*n*x^2*
ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 8*b*d^(3/2)*Sqrt[d + e*x]*Log[c*x^n] + 20
*b*Sqrt[d]*e*x*Sqrt[d + e*x]*Log[c*x^n] - 6*a*e^2*x^2*Log[Sqrt[d] - Sqrt[d
 + e*x]] - 6*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] - Sqrt[d + e*x]] + 3*b*e^2*n
*x^2*Log[Sqrt[d] - Sqrt[d + e*x]]^2 + 6*a*e^2*x^2*Log[Sqrt[d] + Sqrt[d + e
*x]] + 6*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] - 3*b*e^2*n*x^2
*Log[Sqrt[d] + Sqrt[d + e*x]]^2 - 6*b*e^2*n*x^2*Log[Sqrt[d] + Sqrt[d + e*x
]]*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])] + 6*b*e^2*n*x^2*Log[Sqrt[d] - Sqrt
[d + e*x]]*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2] + 6*b*e^2*n*x^2*PolyLog[2, 1
/2 - Sqrt[d + e*x]/(2*Sqrt[d])] - 6*b*e^2*n*x^2*PolyLog[2, (1 + Sqrt[d + e
*x]/Sqrt[d])/2])/(Sqrt[d]*x^2)
```

3.143.3 Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 280, normalized size of antiderivative = 0.96, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx$$
$$\Big\downarrow \text{ 2792}$$

$$-bn\int -\frac{\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)x^2}{\sqrt{d}}+\sqrt{d+ex}(2d+5ex)}{4x^3}dx-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4\sqrt{d}}-\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4x}-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}bn\int \frac{\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)x^2}{\sqrt{d}}+\sqrt{d+ex}(2d+5ex)}{x^3}dx-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4\sqrt{d}}-\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4x}-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{4}bn\int \left(\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)e^2}{\sqrt{d}x}+\frac{5\sqrt{d+ex}e}{x^2}+\frac{2d\sqrt{d+ex}}{x^3}\right)dx-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4\sqrt{d}}-\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4x}-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4\sqrt{d}}-\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4x}-\frac{(d+ex)^{3/2}(a+b\log(cx^n))}{2x^2}+\frac{1}{4}bn\left(\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}}-\frac{9e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{2\sqrt{d}}-\frac{6e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}}-\frac{3e^2\text{ PolyLog}\left(2,1-\right.}{\sqrt{d}}\right.$$

input
```
Int[((d + e*x)^(3/2)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(-3*e*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/(4*x) - ((d + e*x)^(3/2)*(a + b*Lo
g[c*x^n]))/(2*x^2) - (3*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^
n]))/(4*Sqrt[d]) + (b*n*(-((d*Sqrt[d + e*x])/x^2) - (11*e*Sqrt[d + e*x])/(
2*x) - (9*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(2*Sqrt[d]) + (3*e^2*ArcTanh
[Sqrt[d + e*x]/Sqrt[d]]^2)/Sqrt[d] - (6*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]
*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/Sqrt[d] - (3*e^2*PolyLog[2, 1
 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])])/Sqrt[d]))/4
```

3.143. $\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx$

3.143.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.143.4 Maple [F]

$$\int \frac{(ex+d)^{\frac{3}{2}} (a+b\ln (c\,x^{n}))}{x^{3}}dx$$

input
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^3,x)
```

output
```
int((e*x+d)^(3/2)*(a+b*ln(c*x^n))/x^3,x)
```

3.143.5 Fricas [F]

$$\int \frac{(d+ex)^{3/2} (a+b\log (cx^n))}{x^3} \, dx = \int \frac{(ex+d)^{\frac{3}{2}}(b\log (cx^n)+a)}{x^3} \, dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
integral(((b*e*x + b*d)*sqrt(e*x + d)*log(c*x^n) + (a*e*x + a*d)*sqrt(e*x
+ d))/x^3, x)
```

3.143.6 Sympy [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(a+b\log(cx^n))(d+ex)^{\frac{3}{2}}}{x^3}\,dx$$

input
```
integrate((e*x+d)**(3/2)*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x)**(3/2)/x**3, x)
```

3.143.7 Maxima [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
1/8*(3*e^2*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/sqrt(d
) - 2*(5*(e*x + d)^(3/2)*e^2 - 3*sqrt(e*x + d)*d*e^2)/((e*x + d)^2 - 2*(e*
x + d)*d + d^2))*a + b*integrate((e*x*log(c) + d*log(c) + (e*x + d)*log(x^
n))*sqrt(e*x + d)/x^3, x)
```

3.143.8 Giac [F]

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(ex+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((e*x+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
integrate((e*x + d)^(3/2)*(b*log(c*x^n) + a)/x^3, x)
```

3.143.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(a+b\,\ln(c\,x^n))\,(d+e\,x)^{3/2}}{x^3}\,dx$$

input
```
int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x^3,x)
```

output
```
int(((a + b*log(c*x^n))*(d + e*x)^(3/2))/x^3, x)
```

3.144 $\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$

3.144.1 Optimal result

Integrand size = 23, antiderivative size = 217

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \frac{64bd^3n\sqrt{d+ex}}{35e^4} - \frac{76bd^2n(d+ex)^{3/2}}{105e^4} + \frac{64bdn(d+ex)^{5/2}}{175e^4} - \frac{4bn(d+ex)^{7/2}}{49e^4} - \frac{64bd^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{35e^4} - \frac{2d^3\sqrt{d+ex}(a+b\log(cx^n))}{e^4} + \frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{e^4} - \frac{6d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4} + \frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}$$

output
```
-76/105*b*d^2*n*(e*x+d)^(3/2)/e^4+64/175*b*d*n*(e*x+d)^(5/2)/e^4-4/49*b*n*
(e*x+d)^(7/2)/e^4-64/35*b*d^(7/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e^4+2*d
^2*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^4-6/5*d*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e
^4+2/7*(e*x+d)^(7/2)*(a+b*ln(c*x^n))/e^4+64/35*b*d^3*n*(e*x+d)^(1/2)/e^4-2
*d^3*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/e^4
```

3.144.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 150, normalized size of antiderivative = 0.69

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx =$$
$$-\frac{2\left(3360bd^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\sqrt{d+ex}(105a(16d^3-8d^2ex+6de^2x^2-5e^3x^3)+2bn(-1276d^3+218\right.}{3675e^4}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

output
```
(-2*(3360*b*d^(7/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(105*
a*(16*d^3 - 8*d^2*e*x + 6*d*e^2*x^2 - 5*e^3*x^3) + 2*b*n*(-1276*d^3 + 218*
d^2*e*x - 111*d*e^2*x^2 + 75*e^3*x^3) + 105*b*(16*d^3 - 8*d^2*e*x + 6*d*e^
2*x^2 - 5*e^3*x^3)*Log[c*x^n])))/(3675*e^4)
```

3.144.3 Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 198, normalized size of antiderivative = 0.91, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2792, 27, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$$
$$\Big\downarrow \; 2792$$
$$-bn\int -\frac{2\sqrt{d+ex}\left(16d^3-8exd^2+6e^2x^2d-5e^3x^3\right)}{35e^4x}dx-\frac{2d^3\sqrt{d+ex}(a+b\log(cx^n))}{e^4}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}-\frac{6d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}$$
$$\Big\downarrow \; 27$$
$$\frac{2bn\int \frac{\sqrt{d+ex}\left(16d^3-8exd^2+6e^2x^2d-5e^3x^3\right)}{x}dx}{35e^4}-\frac{2d^3\sqrt{d+ex}(a+b\log(cx^n))}{e^4}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}-\frac{6d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}$$
$$\Big\downarrow \; 2123$$

$$\frac{2bn\int\left(\frac{16\sqrt{d+ex}d^3}{x}-19e\sqrt{d+ex}d^2+16e(d+ex)^{3/2}d-5e(d+ex)^{5/2}\right)dx}{35e^4}-\frac{2d^3\sqrt{d+ex}(a+b\log(cx^n))}{e^4}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}-\frac{6d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2d^3\sqrt{d+ex}(a+b\log(cx^n))}{e^4}+\frac{2d^2(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{7/2}(a+b\log(cx^n))}{7e^4}-\frac{6d(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}+\frac{2bn\left(-32d^{7/2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+32d^3\sqrt{d+ex}-\frac{38}{3}d^2(d+ex)^{3/2}+\frac{32}{5}d(d+ex)^{5/2}-\frac{10}{7}(d+ex)^{7/2}\right)}{35e^4}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

output
```
(2*b*n*(32*d^3*Sqrt[d + e*x] - (38*d^2*(d + e*x)^(3/2))/3 + (32*d*(d + e*x
)^(5/2))/5 - (10*(d + e*x)^(7/2))/7 - 32*d^(7/2)*ArcTanh[Sqrt[d + e*x]/Sqr
t[d]]))/(35*e^4) - (2*d^3*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e^4 + (2*d^2*(
d + e*x)^(3/2)*(a + b*Log[c*x^n]))/e^4 - (6*d*(d + e*x)^(5/2)*(a + b*Log[c
*x^n]))/(5*e^4) + (2*(d + e*x)^(7/2)*(a + b*Log[c*x^n]))/(7*e^4)
```

3.144.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.144.4 Maple [F]

$$\int \frac{x^3(a+b\ln(c\,x^n))}{\sqrt{ex+d}}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

3.144.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 395, normalized size of antiderivative = 1.82

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$$
$$= \left[\frac{2\left(1680\,bd^{\frac{7}{2}}n\log\left(\frac{ex-2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(2552\,bd^3n-1680\,ad^3-75\,(2\,be^3n-7\,ae^3)x^3+6\,(37\,bde^2n-10\right.}{}\right.$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
[2/3675*(1680*b*d^(7/2)*n*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) + (
2552*b*d^3*n - 1680*a*d^3 - 75*(2*b*e^3*n - 7*a*e^3)*x^3 + 6*(37*b*d*e^2*n
 - 105*a*d*e^2)*x^2 - 4*(109*b*d^2*e*n - 210*a*d^2*e)*x + 105*(5*b*e^3*x^3
 - 6*b*d*e^2*x^2 + 8*b*d^2*e*x - 16*b*d^3)*log(c) + 105*(5*b*e^3*n*x^3 - 6
*b*d*e^2*n*x^2 + 8*b*d^2*e*n*x - 16*b*d^3*n)*log(x))*sqrt(e*x + d))/e^4, 2
/3675*(3360*b*sqrt(-d)*d^3*n*arctan(sqrt(e*x + d)*sqrt(-d)/d) + (2552*b*d^
3*n - 1680*a*d^3 - 75*(2*b*e^3*n - 7*a*e^3)*x^3 + 6*(37*b*d*e^2*n - 105*a*
d*e^2)*x^2 - 4*(109*b*d^2*e*n - 210*a*d^2*e)*x + 105*(5*b*e^3*x^3 - 6*b*d*
e^2*x^2 + 8*b*d^2*e*x - 16*b*d^3)*log(c) + 105*(5*b*e^3*n*x^3 - 6*b*d*e^2*
n*x^2 + 8*b*d^2*e*n*x - 16*b*d^3*n)*log(x))*sqrt(e*x + d))/e^4]
```

3.144.6 Sympy [A] (verification not implemented)

Time = 57.10 (sec) , antiderivative size = 396, normalized size of antiderivative = 1.82

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = a\left(\begin{cases} -\frac{2d^3\sqrt{d+ex}}{e^4} + \frac{2d^2(d+ex)^{\frac{3}{2}}}{e^4} - \frac{6d(d+ex)^{\frac{5}{2}}}{5e^4} + \frac{2(d+ex)^{\frac{7}{2}}}{7e^4} & \text{for } e\neq 0 \\ \frac{x^4}{4\sqrt{d}} & \text{otherwise} \end{cases}\right) - bn\left(\begin{cases} \frac{9596d^{\frac{7}{2}}\sqrt{1+\frac{ex}{d}}}{3675e^4} + \frac{38d^{\frac{7}{2}}\log\left(\frac{ex}{d}\right)}{35e^4} - \frac{76d^{\frac{7}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{35e^4} + \frac{4d^{\frac{7}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e^4} + \frac{872d^{\frac{5}{2}}x\sqrt{1+\frac{ex}{d}}}{3675e^3} - \frac{148d^{\frac{3}{2}}x^2\sqrt{1+\frac{ex}{d}}}{1225e^2} + \\ \frac{x^4}{16\sqrt{d}} \end{cases}\right) + b\left(\begin{cases} -\frac{2d^3\sqrt{d+ex}}{e^4} + \frac{2d^2(d+ex)^{\frac{3}{2}}}{e^4} - \frac{6d(d+ex)^{\frac{5}{2}}}{5e^4} + \frac{2(d+ex)^{\frac{7}{2}}}{7e^4} & \text{for } e\neq 0 \\ \frac{x^4}{4\sqrt{d}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**(1/2),x)
```

output
```
a*Piecewise((-2*d**3*sqrt(d + e*x)/e**4 + 2*d**2*(d + e*x)**(3/2)/e**4 - 6
*d*(d + e*x)**(5/2)/(5*e**4) + 2*(d + e*x)**(7/2)/(7*e**4), Ne(e, 0)), (x*
*4/(4*sqrt(d)), True)) - b*n*Piecewise((9596*d**(7/2)*sqrt(1 + e*x/d)/(367
5*e**4) + 38*d**(7/2)*log(e*x/d)/(35*e**4) - 76*d**(7/2)*log(sqrt(1 + e*x/
d) + 1)/(35*e**4) + 4*d**(7/2)*asinh(sqrt(d)/(sqrt(e)*sqrt(x)))/e**4 + 872
*d**(5/2)*x*sqrt(1 + e*x/d)/(3675*e**3) - 148*d**(3/2)*x**2*sqrt(1 + e*x/d
)/(1225*e**2) + 4*sqrt(d)*x**3*sqrt(1 + e*x/d)/(49*e) - 4*d**4/(e**(9/2)*s
qrt(x)*sqrt(d/(e*x) + 1)) - 4*d**3*sqrt(x)/(e**(7/2)*sqrt(d/(e*x) + 1)), (
e > -oo) & (e < oo) & Ne(e, 0)), (x**4/(16*sqrt(d)), True)) + b*Piecewise(
(-2*d**3*sqrt(d + e*x)/e**4 + 2*d**2*(d + e*x)**(3/2)/e**4 - 6*d*(d + e*x)
**(5/2)/(5*e**4) + 2*(d + e*x)**(7/2)/(7*e**4), Ne(e, 0)), (x**4/(4*sqrt(d
)), True))*log(c*x**n)
```

3.144.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 215, normalized size of antiderivative = 0.99

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$$
$$= \frac{4}{3675}bn\left(\frac{840\,d^{\frac{7}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^4} - \frac{75\,(ex+d)^{\frac{7}{2}} - 336\,(ex+d)^{\frac{5}{2}}d + 665\,(ex+d)^{\frac{3}{2}}d^2 - 1680\sqrt{ex+d}d^3}{e^4}\right)$$
$$+ \frac{2}{35}b\left(\frac{5\,(ex+d)^{\frac{7}{2}}}{e^4} - \frac{21\,(ex+d)^{\frac{5}{2}}d}{e^4} + \frac{35\,(ex+d)^{\frac{3}{2}}d^2}{e^4} - \frac{35\sqrt{ex+d}d^3}{e^4}\right)\log(cx^n)$$
$$+ \frac{2}{35}a\left(\frac{5\,(ex+d)^{\frac{7}{2}}}{e^4} - \frac{21\,(ex+d)^{\frac{5}{2}}d}{e^4} + \frac{35\,(ex+d)^{\frac{3}{2}}d^2}{e^4} - \frac{35\sqrt{ex+d}d^3}{e^4}\right)$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
4/3675*b*n*(840*d^(7/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqr
t(d)))/e^4 - (75*(e*x + d)^(7/2) - 336*(e*x + d)^(5/2)*d + 665*(e*x + d)^(
3/2)*d^2 - 1680*sqrt(e*x + d)*d^3)/e^4) + 2/35*b*(5*(e*x + d)^(7/2)/e^4 -
21*(e*x + d)^(5/2)*d/e^4 + 35*(e*x + d)^(3/2)*d^2/e^4 - 35*sqrt(e*x + d)*d
^3/e^4)*log(c*x^n) + 2/35*a*(5*(e*x + d)^(7/2)/e^4 - 21*(e*x + d)^(5/2)*d/
e^4 + 35*(e*x + d)^(3/2)*d^2/e^4 - 35*sqrt(e*x + d)*d^3/e^4)
```

3.144.8 Giac [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 252, normalized size of antiderivative = 1.16

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \frac{64\,bd^4n\arctan\left(\frac{\sqrt{ex+d}}{\sqrt{-d}}\right)}{35\sqrt{-d}e^4}$$
$$+ \frac{2}{35}\left(\frac{5\,(ex+d)^{\frac{7}{2}}bn}{e^4} - \frac{21\,(ex+d)^{\frac{5}{2}}bdn}{e^4} + \frac{35\,(ex+d)^{\frac{3}{2}}bd^2n}{e^4} - \frac{35\sqrt{ex+d}bd^3n}{e^4}\right)\log(ex)$$
$$- \frac{2\,(7\,bn\log(e) + 2\,bn - 7\,b\log(c) - 7\,a)(ex+d)^{\frac{7}{2}}}{49\,e^4}$$
$$+ \frac{2\,(105\,bdn\log(e) + 32\,bdn - 105\,bd\log(c) - 105\,ad)(ex+d)^{\frac{5}{2}}}{175\,e^4}$$
$$- \frac{2\,(105\,bd^2n\log(e) + 38\,bd^2n - 105\,bd^2\log(c) - 105\,ad^2)(ex+d)^{\frac{3}{2}}}{105\,e^4}$$
$$+ \frac{2\,(35\,bd^3n\log(e) + 32\,bd^3n - 35\,bd^3\log(c) - 35\,ad^3)\sqrt{ex+d}}{35\,e^4}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
64/35*b*d^4*n*arctan(sqrt(e*x + d)/sqrt(-d))/(sqrt(-d)*e^4) + 2/35*(5*(e*x
 + d)^(7/2)*b*n/e^4 - 21*(e*x + d)^(5/2)*b*d*n/e^4 + 35*(e*x + d)^(3/2)*b*
d^2*n/e^4 - 35*sqrt(e*x + d)*b*d^3*n/e^4)*log(e*x) - 2/49*(7*b*n*log(e) +
2*b*n - 7*b*log(c) - 7*a)*(e*x + d)^(7/2)/e^4 + 2/175*(105*b*d*n*log(e) +
32*b*d*n - 105*b*d*log(c) - 105*a*d)*(e*x + d)^(5/2)/e^4 - 2/105*(105*b*d^
2*n*log(e) + 38*b*d^2*n - 105*b*d^2*log(c) - 105*a*d^2)*(e*x + d)^(3/2)/e^
4 + 2/35*(35*b*d^3*n*log(e) + 32*b*d^3*n - 35*b*d^3*log(c) - 35*a*d^3)*sqr
t(e*x + d)/e^4
```

3.144.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{\sqrt{d+e\,x}}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^(1/2),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^(1/2), x)
```

3.145 $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$

3.145.1 Optimal result

Integrand size = 23, antiderivative size = 169

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = -\frac{32bd^2n\sqrt{d+ex}}{15e^3} + \frac{28bdn(d+ex)^{3/2}}{45e^3} - \frac{4bn(d+ex)^{5/2}}{25e^3} + \frac{32bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{15e^3} + \frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3} - \frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3} + \frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}$$

output
```
28/45*b*d*n*(e*x+d)^(3/2)/e^3-4/25*b*n*(e*x+d)^(5/2)/e^3+32/15*b*d^(5/2)*n
*arctanh((e*x+d)^(1/2)/d^(1/2))/e^3-4/3*d*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^
3+2/5*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^3-32/15*b*d^2*n*(e*x+d)^(1/2)/e^3+2*
d^2*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/e^3
```

3.145.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 118, normalized size of antiderivative = 0.70

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \frac{480bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + 2\sqrt{d+ex}(15a(8d^2-4dex+3e^2x^2) - 2bn(94d^2-17dex+9e^2x^2) + 15b(8d}{225e^3}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

output
```
(480*b*d^(5/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(15*a*(8
*d^2 - 4*d*e*x + 3*e^2*x^2) - 2*b*n*(94*d^2 - 17*d*e*x + 9*e^2*x^2) + 15*b
*(8*d^2 - 4*d*e*x + 3*e^2*x^2)*Log[c*x^n]))/(225*e^3)
```

3.145.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 167, normalized size of antiderivative = 0.99, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2792, 27, 1192, 25, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{2\sqrt{d+ex}(8d^2-4exd+3e^2x^2)}{15e^3x}dx+\frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{27}$$

$$-\frac{2bn\int \frac{\sqrt{d+ex}(8d^2-4exd+3e^2x^2)}{x}dx}{15e^3}+\frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1192}$$

$$-\frac{4bn\int \frac{(d+ex)(15d^2e^2+3(d+ex)^2e^2-10d(d+ex)e^2)}{ex}d\sqrt{d+ex}}{15e^5}+\frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{25}$$

$$\frac{4bn\int -\frac{(d+ex)(15d^2e^2+3(d+ex)^2e^2-10d(d+ex)e^2)}{ex}d\sqrt{d+ex}}{15e^5}+\frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1584}$$

$$\frac{4bn\int\left(-\frac{8ed^3}{x}-8e^2d^2+7e^2(d+ex)d-3e^2(d+ex)^2\right)d\sqrt{d+ex}}{15e^5}+\frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{2d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{4d(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}-\frac{4bn\left(-8d^{5/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+8d^2e^2\sqrt{d+ex}-\frac{7}{3}de^2(d+ex)^{3/2}+\frac{3}{5}e^2(d+ex)^{5/2}\right)}{15e^5}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

output
```
(-4*b*n*(8*d^2*e^2*Sqrt[d + e*x] - (7*d*e^2*(d + e*x)^(3/2))/3 + (3*e^2*(d
 + e*x)^(5/2))/5 - 8*d^(5/2)*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/(15*e^5)
 + (2*d^2*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e^3 - (4*d*(d + e*x)^(3/2)*(a
+ b*Log[c*x^n]))/(3*e^3) + (2*(d + e*x)^(5/2)*(a + b*Log[c*x^n]))/(5*e^3)
```

3.145.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

3.145. $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.145.4 Maple [F]

$$\int \frac{x^2(a+b\ln(c\,x^n))}{\sqrt{ex+d}}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

3.145.5 Fricas [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 296, normalized size of antiderivative = 1.75

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \left[\frac{2\left(120\,bd^{\frac{5}{2}}n\log\left(\frac{ex+2\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)-(188\,bd^2n-120\,ad^2+9\,(2\,be^2n-5\,ae^2)x^2-2\,(17\,bden-30\,ade)x\right.}{225\,e^3}\right.$$
$$-\frac{2\left(240\,b\sqrt{-d}d^2n\arctan\left(\frac{\sqrt{ex+d}\sqrt{-d}}{d}\right)+(188\,bd^2n-120\,ad^2+9\,(2\,be^2n-5\,ae^2)x^2-2\,(17\,bden-30\,ad\right.}{225\,e^3}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
[2/225*(120*b*d^(5/2)*n*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) - (18
8*b*d^2*n - 120*a*d^2 + 9*(2*b*e^2*n - 5*a*e^2)*x^2 - 2*(17*b*d*e*n - 30*a
*d*e)*x - 15*(3*b*e^2*x^2 - 4*b*d*e*x + 8*b*d^2)*log(c) - 15*(3*b*e^2*n*x^
2 - 4*b*d*e*n*x + 8*b*d^2*n)*log(x))*sqrt(e*x + d))/e^3, -2/225*(240*b*sqr
t(-d)*d^2*n*arctan(sqrt(e*x + d)*sqrt(-d)/d) + (188*b*d^2*n - 120*a*d^2 +
9*(2*b*e^2*n - 5*a*e^2)*x^2 - 2*(17*b*d*e*n - 30*a*d*e)*x - 15*(3*b*e^2*x^
2 - 4*b*d*e*x + 8*b*d^2)*log(c) - 15*(3*b*e^2*n*x^2 - 4*b*d*e*n*x + 8*b*d^
2*n)*log(x))*sqrt(e*x + d))/e^3]
```

3.145.6 Sympy [A] (verification not implemented)

Time = 42.28 (sec) , antiderivative size = 337, normalized size of antiderivative = 1.99

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = a\left(\begin{cases} \frac{2d^2\sqrt{d+ex}}{e^3} - \frac{4d(d+ex)^{\frac{3}{2}}}{3e^3} + \frac{2(d+ex)^{\frac{5}{2}}}{5e^3} & \text{for } e \neq 0 \\ \frac{x^3}{3\sqrt{d}} & \text{otherwise} \end{cases}\right)$$
$$- bn\left(\begin{cases} -\frac{524d^{\frac{5}{2}}\sqrt{1+\frac{ex}{d}}}{225e^3} - \frac{14d^{\frac{5}{2}}\log\left(\frac{ex}{d}\right)}{15e^3} + \frac{28d^{\frac{5}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{15e^3} - \frac{4d^{\frac{5}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e^3} - \frac{68d^{\frac{3}{2}}x\sqrt{1+\frac{ex}{d}}}{225e^2} + \frac{4\sqrt{d}x^2\sqrt{1+\frac{ex}{d}}}{25e} + \\ \frac{x^3}{9\sqrt{d}} \end{cases}\right)$$
$$+ b\left(\begin{cases} \frac{2d^2\sqrt{d+ex}}{e^3} - \frac{4d(d+ex)^{\frac{3}{2}}}{3e^3} + \frac{2(d+ex)^{\frac{5}{2}}}{5e^3} & \text{for } e \neq 0 \\ \frac{x^3}{3\sqrt{d}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**(1/2),x)
```

output
```
a*Piecewise((2*d**2*sqrt(d + e*x)/e**3 - 4*d*(d + e*x)**(3/2)/(3*e**3) + 2
*(d + e*x)**(5/2)/(5*e**3), Ne(e, 0)), (x**3/(3*sqrt(d)), True)) - b*n*Pie
cewise((-524*d**(5/2)*sqrt(1 + e*x/d)/(225*e**3) - 14*d**(5/2)*log(e*x/d)/
(15*e**3) + 28*d**(5/2)*log(sqrt(1 + e*x/d) + 1)/(15*e**3) - 4*d**(5/2)*as
inh(sqrt(d)/(sqrt(e)*sqrt(x)))/e**3 - 68*d**(3/2)*x*sqrt(1 + e*x/d)/(225*e
**2) + 4*sqrt(d)*x**2*sqrt(1 + e*x/d)/(25*e) + 4*d**3/(e**(7/2)*sqrt(x)*sq
rt(d/(e*x) + 1)) + 4*d**2*sqrt(x)/(e**(5/2)*sqrt(d/(e*x) + 1)), (e > -oo)
& (e < oo) & Ne(e, 0)), (x**3/(9*sqrt(d)), True)) + b*Piecewise((2*d**2*sq
rt(d + e*x)/e**3 - 4*d*(d + e*x)**(3/2)/(3*e**3) + 2*(d + e*x)**(5/2)/(5*e
**3), Ne(e, 0)), (x**3/(3*sqrt(d)), True))*log(c*x**n)
```

3.145.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 172, normalized size of antiderivative = 1.02

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = -\frac{4}{225}\,bn\left(\frac{60\,d^{\frac{5}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^3}+\frac{9\,(ex+d)^{\frac{5}{2}}-35\,(ex+d)^{\frac{3}{2}}d+120\,\sqrt{ex+d}d^2}{e^3}\right) + \frac{2}{15}\,b\left(\frac{3\,(ex+d)^{\frac{5}{2}}}{e^3}-\frac{10\,(ex+d)^{\frac{3}{2}}d}{e^3}+\frac{15\,\sqrt{ex+d}d^2}{e^3}\right)\log(cx^n) + \frac{2}{15}\,a\left(\frac{3\,(ex+d)^{\frac{5}{2}}}{e^3}-\frac{10\,(ex+d)^{\frac{3}{2}}d}{e^3}+\frac{15\,\sqrt{ex+d}d^2}{e^3}\right)$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
-4/225*b*n*(60*d^(5/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt
(d)))/e^3 + (9*(e*x + d)^(5/2) - 35*(e*x + d)^(3/2)*d + 120*sqrt(e*x + d)*
d^2)/e^3) + 2/15*b*(3*(e*x + d)^(5/2)/e^3 - 10*(e*x + d)^(3/2)*d/e^3 + 15*
sqrt(e*x + d)*d^2/e^3)*log(c*x^n) + 2/15*a*(3*(e*x + d)^(5/2)/e^3 - 10*(e*
x + d)^(3/2)*d/e^3 + 15*sqrt(e*x + d)*d^2/e^3)
```

3.145.8 Giac [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 192, normalized size of antiderivative = 1.14

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = -\frac{32\,bd^3n\arctan\left(\frac{\sqrt{ex+d}}{\sqrt{-d}}\right)}{15\,\sqrt{-d}e^3} + \frac{2}{15}\left(\frac{3\,(ex+d)^{\frac{5}{2}}bn}{e^3}-\frac{10\,(ex+d)^{\frac{3}{2}}bdn}{e^3}+\frac{15\,\sqrt{ex+d}bd^2n}{e^3}\right)\log(ex) - \frac{2\,(5\,bn\log(e)+2\,bn-5\,b\log(c)-5\,a)(ex+d)^{\frac{5}{2}}}{25\,e^3} + \frac{4\,(15\,bdn\log(e)+7\,bdn-15\,bd\log(c)-15\,ad)(ex+d)^{\frac{3}{2}}}{45\,e^3} - \frac{2\,(15\,bd^2n\log(e)+16\,bd^2n-15\,bd^2\log(c)-15\,ad^2)\sqrt{ex+d}}{15\,e^3}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
-32/15*b*d^3*n*arctan(sqrt(e*x + d)/sqrt(-d))/(sqrt(-d)*e^3) + 2/15*(3*(e*
x + d)^(5/2)*b*n/e^3 - 10*(e*x + d)^(3/2)*b*d*n/e^3 + 15*sqrt(e*x + d)*b*d
^2*n/e^3)*log(e*x) - 2/25*(5*b*n*log(e) + 2*b*n - 5*b*log(c) - 5*a)*(e*x +
 d)^(5/2)/e^3 + 4/45*(15*b*d*n*log(e) + 7*b*d*n - 15*b*d*log(c) - 15*a*d)*
(e*x + d)^(3/2)/e^3 - 2/15*(15*b*d^2*n*log(e) + 16*b*d^2*n - 15*b*d^2*log(
c) - 15*a*d^2)*sqrt(e*x + d)/e^3
```

3.145.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{\sqrt{d+e\,x}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^(1/2),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^(1/2), x)
```

3.146 $\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$

3.146.1 Optimal result

Integrand size = 21, antiderivative size = 119

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \frac{8bdn\sqrt{d+ex}}{3e^2} - \frac{4bn(d+ex)^{3/2}}{9e^2} - \frac{8bd^{3/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e^2} - \frac{2d\sqrt{d+ex}(a+b\log(cx^n))}{e^2} + \frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}$$

output
```
-4/9*b*n*(e*x+d)^(3/2)/e^2-8/3*b*d^(3/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))/
e^2+2/3*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^2+8/3*b*d*n*(e*x+d)^(1/2)/e^2-2*d*
(a+b*ln(c*x^n))*(e*x+d)^(1/2)/e^2
```

3.146.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.67

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = -\frac{2\left(12bd^{3/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right) + \sqrt{d+ex}(6ad-10bdn-3aex+2benx+b(6d-3ex)\log(cx^n))\right)}{9e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

output
```
(-2*(12*b*d^(3/2)*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + Sqrt[d + e*x]*(6*a*d
- 10*b*d*n - 3*a*e*x + 2*b*e*n*x + b*(6*d - 3*e*x)*Log[c*x^n])))/(9*e^2)
```

3.146.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.95, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286, Rules used = {2792, 27, 90, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int -\frac{2(2d-ex)\sqrt{d+ex}}{3e^2x}dx+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{2d\sqrt{d+ex}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{2bn\int \frac{(2d-ex)\sqrt{d+ex}}{x}dx}{3e^2}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{2d\sqrt{d+ex}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 90}$$

$$\frac{2bn\left(2d\int \frac{\sqrt{d+ex}}{x}dx-\frac{2}{3}(d+ex)^{3/2}\right)}{3e^2}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{2d\sqrt{d+ex}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 60}$$

$$\frac{2bn\left(2d\left(d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)-\frac{2}{3}(d+ex)^{3/2}\right)}{3e^2}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{2d\sqrt{d+ex}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 73}$$

$$\frac{2bn\left(2d\left(\frac{2d\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)-\frac{2}{3}(d+ex)^{3/2}\right)}{3e^2}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{2d\sqrt{d+ex}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 221}$$

$$\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{2d\sqrt{d+ex}(a+b\log(cx^n))}{e^2}+\frac{2bn\left(2d\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)-\frac{2}{3}(d+ex)^{3/2}\right)}{3e^2}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/Sqrt[d + e*x],x]
```

output
```
(2*b*n*((-2*(d + e*x)^(3/2))/3 + 2*d*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh[
Sqrt[d + e*x]/Sqrt[d]])))/(3*e^2) - (2*d*Sqrt[d + e*x]*(a + b*Log[c*x^n]))
/e^2 + (2*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/(3*e^2)
```

3.146.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.146.4 Maple [F]

$$\int \frac{x(a+b\ln(c\,x^{n}))}{\sqrt{ex+d}}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^(1/2),x)
```

3.146.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 189, normalized size of antiderivative = 1.59

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx$$
$$= \left[\frac{2\left(6\,bd^{\frac{3}{2}}n\log\left(\frac{ex-2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(10\,bdn-6\,ad-(2\,ben-3\,ae)x+3\,(bex-2\,bd)\log(c)+3\,(benx-\right.}{9\,e^2}\right.$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
[2/9*(6*b*d^(3/2)*n*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) + (10*b*d
*n - 6*a*d - (2*b*e*n - 3*a*e)*x + 3*(b*e*x - 2*b*d)*log(c) + 3*(b*e*n*x -
 2*b*d*n)*log(x))*sqrt(e*x + d))/e^2, 2/9*(12*b*sqrt(-d)*d*n*arctan(sqrt(e
*x + d)*sqrt(-d)/d) + (10*b*d*n - 6*a*d - (2*b*e*n - 3*a*e)*x + 3*(b*e*x -
 2*b*d)*log(c) + 3*(b*e*n*x - 2*b*d*n)*log(x))*sqrt(e*x + d))/e^2]
```

3.146.6 Sympy [A] (verification not implemented)

Time = 32.67 (sec) , antiderivative size = 272, normalized size of antiderivative = 2.29

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = a\left(\begin{cases} -\frac{2d\sqrt{d+ex}}{e^2}+\frac{2(d+ex)^{\frac{3}{2}}}{3e^2} & \text{for } e\neq 0 \\ \frac{x^2}{2\sqrt{d}} & \text{otherwise} \end{cases}\right)$$
$$-bn\left(\begin{cases} \frac{16d^{\frac{3}{2}}\sqrt{1+\frac{ex}{d}}}{9e^2}+\frac{2d^{\frac{3}{2}}\log\left(\frac{ex}{d}\right)}{3e^2}-\frac{4d^{\frac{3}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{3e^2}+\frac{4d^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e^2}+\frac{4\sqrt{d}x\sqrt{1+\frac{ex}{d}}}{9e}-\frac{4d^2}{e^{\frac{5}{2}}\sqrt{x}\sqrt{\frac{d}{ex}+1}}-\frac{4d\sqrt{x}}{e^{\frac{3}{2}}\sqrt{\frac{d}{ex}}} \\ \frac{x^2}{4\sqrt{d}} \end{cases}\right.$$
$$+b\left(\begin{cases} -\frac{2d\sqrt{d+ex}}{e^2}+\frac{2(d+ex)^{\frac{3}{2}}}{3e^2} & \text{for } e\neq 0 \\ \frac{x^2}{2\sqrt{d}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d)**(1/2),x)
```

output
```
a*Piecewise((-2*d*sqrt(d + e*x)/e**2 + 2*(d + e*x)**(3/2)/(3*e**2), Ne(e,
0)), (x**2/(2*sqrt(d)), True)) - b*n*Piecewise((16*d**(3/2)*sqrt(1 + e*x/d
)/(9*e**2) + 2*d**(3/2)*log(e*x/d)/(3*e**2) - 4*d**(3/2)*log(sqrt(1 + e*x/
d) + 1)/(3*e**2) + 4*d**(3/2)*asinh(sqrt(d)/(sqrt(e)*sqrt(x)))/e**2 + 4*sq
rt(d)*x*sqrt(1 + e*x/d)/(9*e) - 4*d**2/(e**(5/2)*sqrt(x)*sqrt(d/(e*x) + 1)
) - 4*d*sqrt(x)/(e**(3/2)*sqrt(d/(e*x) + 1)), (e > -oo) & (e < oo) & Ne(e,
 0)), (x**2/(4*sqrt(d)), True)) + b*Piecewise((-2*d*sqrt(d + e*x)/e**2 + 2
*(d + e*x)**(3/2)/(3*e**2), Ne(e, 0)), (x**2/(2*sqrt(d)), True))*log(c*x**
n)
```

3.146.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.07

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \frac{4}{9}\,bn\left(\frac{3\,d^{\frac{3}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^2}-\frac{(ex+d)^{\frac{3}{2}}-6\sqrt{ex+d}d}{e^2}\right)$$
$$+\frac{2}{3}\,b\left(\frac{(ex+d)^{\frac{3}{2}}}{e^2}-\frac{3\sqrt{ex+d}d}{e^2}\right)\log(cx^n)$$
$$+\frac{2}{3}\,a\left(\frac{(ex+d)^{\frac{3}{2}}}{e^2}-\frac{3\sqrt{ex+d}d}{e^2}\right)$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
4/9*b*n*(3*d^(3/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d))
)/e^2 - ((e*x + d)^(3/2) - 6*sqrt(e*x + d)*d)/e^2) + 2/3*b*((e*x + d)^(3/2
)/e^2 - 3*sqrt(e*x + d)*d/e^2)*log(c*x^n) + 2/3*a*((e*x + d)^(3/2)/e^2 - 3
*sqrt(e*x + d)*d/e^2)
```

3.146.8 Giac [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \frac{8\,bd^2n\arctan\left(\frac{\sqrt{ex+d}}{\sqrt{-d}}\right)}{3\,\sqrt{-d}e^2} + \frac{2}{3}\left(\frac{(ex+d)^{\frac{3}{2}}bn}{e^2} - \frac{3\,\sqrt{ex+d}bdn}{e^2}\right)\log(ex) - \frac{2\,(3\,bn\log(e)+2\,bn-3\,b\log(c)-3\,a)(ex+d)^{\frac{3}{2}}}{9\,e^2} + \frac{2\,(3\,bdn\log(e)+4\,bdn-3\,bd\log(c)-3\,ad)\sqrt{ex+d}}{3\,e^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
8/3*b*d^2*n*arctan(sqrt(e*x + d)/sqrt(-d))/(sqrt(-d)*e^2) + 2/3*((e*x + d)
^(3/2)*b*n/e^2 - 3*sqrt(e*x + d)*b*d*n/e^2)*log(e*x) - 2/9*(3*b*n*log(e) +
 2*b*n - 3*b*log(c) - 3*a)*(e*x + d)^(3/2)/e^2 + 2/3*(3*b*d*n*log(e) + 4*b
*d*n - 3*b*d*log(c) - 3*a*d)*sqrt(e*x + d)/e^2
```

3.146.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex}}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{\sqrt{d+e\,x}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^(1/2),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^(1/2), x)
```

3.147 $\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx$

3.147.1 Optimal result

Integrand size = 20, antiderivative size = 69

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx = -\frac{4bn\sqrt{d+ex}}{e}+\frac{4b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{e}+\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}$$

output
```
4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*d^(1/2)/e-4*b*n*(e*x+d)^(1/2)/e+2*(a+
b*ln(c*x^n))*(e*x+d)^(1/2)/e
```

3.147.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 55, normalized size of antiderivative = 0.80

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx = \frac{4b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+2\sqrt{d+ex}(a-2bn+b\log(cx^n))}{e}$$

input
```
Integrate[(a + b*Log[c*x^n])/Sqrt[d + e*x],x]
```

output
```
(4*b*Sqrt[d]*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 2*Sqrt[d + e*x]*(a - 2*b*n
 + b*Log[c*x^n]))/e
```

3.147.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 67, normalized size of antiderivative = 0.97, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2756, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\int \frac{\sqrt{d+ex}}{x}dx}{e}$$

$$\Big\downarrow \text{60}$$

$$\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)}{e}$$

$$\Big\downarrow \text{73}$$

$$\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(\frac{2d\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)}{e}$$

$$\Big\downarrow \text{221}$$

$$\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e}-\frac{2bn\left(2\sqrt{d+ex}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e}$$

input
```
Int[(a + b*Log[c*x^n])/Sqrt[d + e*x],x]
```

output
```
(-2*b*n*(2*Sqrt[d + e*x] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/e +
(2*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e
```

3.147.3.1 Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

3.147.4 Maple [A] (verified)

Time = 0.40 (sec) , antiderivative size = 62, normalized size of antiderivative = 0.90

method	result	size
derivativedivides	$\frac{2\sqrt{ex+d}\,a+2b\left(\ln(c\,x^{n})\sqrt{ex+d}+2n\left(-\sqrt{ex+d}+\sqrt{d}\,\operatorname{arctanh}\left(\frac{\sqrt{ex+d}}{\sqrt{d}}\right)\right)\right)}{e}$	62
default	$\frac{2\sqrt{ex+d}\,a+2b\left(\ln(c\,x^{n})\sqrt{ex+d}+2n\left(-\sqrt{ex+d}+\sqrt{d}\,\operatorname{arctanh}\left(\frac{\sqrt{ex+d}}{\sqrt{d}}\right)\right)\right)}{e}$	62
parts	$\frac{2a\sqrt{ex+d}}{e}+\frac{2b\left(\ln(c\,x^{n})\sqrt{ex+d}-2n\left(\sqrt{ex+d}-\sqrt{d}\,\operatorname{arctanh}\left(\frac{\sqrt{ex+d}}{\sqrt{d}}\right)\right)\right)}{e}$	64

input
```
int((a+b*ln(c*x^n))/(e*x+d)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
2/e*((e*x+d)^(1/2)*a+b*(ln(c*x^n)*(e*x+d)^(1/2)+2*n*(-(e*x+d)^(1/2)+d^(1/2
)*arctanh((e*x+d)^(1/2)/d^(1/2)))))
```

3.147.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.68

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx = \left[\frac{2\left(b\sqrt{d}n\log\left(\frac{ex+2\sqrt{ex+d}\sqrt{d}+2d}{x}\right)+(bn\log(x)-2bn+b\log(c)+a)\sqrt{ex+d}\right)}{e}, -\frac{2\left(2b\sqrt{-d}n\arctan\left(\frac{\sqrt{ex+d}\sqrt{-d}}{d}\right)-(bn\log(x)-2bn+b\log(c)+a)\sqrt{ex+d}\right)}{e}\right]$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
[2*(b*sqrt(d)*n*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x) + (b*n*log(x)
 - 2*b*n + b*log(c) + a)*sqrt(e*x + d))/e, -2*(2*b*sqrt(-d)*n*arctan(sqrt(
e*x + d)*sqrt(-d)/d) - (b*n*log(x) - 2*b*n + b*log(c) + a)*sqrt(e*x + d))/
e]
```

3.147.6 Sympy [A] (verification not implemented)

Time = 2.30 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.90

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx = a\left(\begin{cases}\frac{2\sqrt{d+ex}}{e} & \text{for } e\neq 0\\ \frac{x}{\sqrt{d}} & \text{otherwise}\end{cases}\right) - bn\left(\begin{cases}-\frac{4\sqrt{d}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e}+\frac{4d}{e^{\frac{3}{2}}\sqrt{x}\sqrt{\frac{d}{ex}+1}}+\frac{4\sqrt{x}}{\sqrt{e}\sqrt{\frac{d}{ex}+1}} & \text{for } e>-\infty\wedge e<\infty\wedge e\neq 0\\ \frac{x}{\sqrt{d}} & \text{otherwise}\end{cases}\right) + b\left(\begin{cases}\frac{2\sqrt{d+ex}}{e} & \text{for } e\neq 0\\ \frac{x}{\sqrt{d}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d)**(1/2),x)
```

output
```
a*Piecewise((2*sqrt(d + e*x)/e, Ne(e, 0)), (x/sqrt(d), True)) - b*n*Piecew
ise((-4*sqrt(d)*asinh(sqrt(d)/(sqrt(e)*sqrt(x)))/e + 4*d/(e**(3/2)*sqrt(x)
*sqrt(d/(e*x) + 1)) + 4*sqrt(x)/(sqrt(e)*sqrt(d/(e*x) + 1)), (e > -oo) & (
e < oo) & Ne(e, 0)), (x/sqrt(d), True)) + b*Piecewise((2*sqrt(d + e*x)/e,
Ne(e, 0)), (x/sqrt(d), True))*log(c*x**n)
```

3.147.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.19

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx = -\frac{2\left(\sqrt{d}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)+2\sqrt{ex+d}\right)bn}{e} + \frac{2\sqrt{ex+d}b\log(cx^n)}{e} + \frac{2\sqrt{ex+d}a}{e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
-2*(sqrt(d)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d))) + 2*s
qrt(e*x + d))*b*n/e + 2*sqrt(e*x + d)*b*log(c*x^n)/e + 2*sqrt(e*x + d)*a/e
```

3.147.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 74, normalized size of antiderivative = 1.07

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx = -\frac{2\left(\left(\frac{2\,d\arctan\left(\frac{\sqrt{ex+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}-\sqrt{ex+d}\log(x)+2\sqrt{ex+d}\right)bn-\sqrt{ex+d}b\log(c)-\sqrt{ex+d}a\right)}{e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
-2*((2*d*arctan(sqrt(e*x + d)/sqrt(-d))/sqrt(-d) - sqrt(e*x + d)*log(x) +
2*sqrt(e*x + d))*b*n - sqrt(e*x + d)*b*log(c) - sqrt(e*x + d)*a)/e
```

3.147.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{\sqrt{d+e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x)^(1/2),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x)^(1/2), x)
```

3.148 $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx$

3.148.1 Optimal result

Integrand size = 23, antiderivative size = 152

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx = \frac{2bn\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{\sqrt{d}} - \frac{2\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \frac{4bn\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}} - \frac{2bn\,\mathrm{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{\sqrt{d}}$$

output
```
2*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))^2/d^(1/2)-2*arctanh((e*x+d)^(1/2)/d^(
1/2))*(a+b*ln(c*x^n))/d^(1/2)-4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^
(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(1/2)-2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2
)-(e*x+d)^(1/2)))/d^(1/2)
```

3.148.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 249, normalized size of antiderivative = 1.64

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx$$

$$= \frac{2(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right) - 2(a+b\log(cx^n))\log\left(\sqrt{d}+\sqrt{d+ex}\right) - bn\Big(\log\left(\sqrt{d}-\sqrt{d+e\right.}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x]),x]
```

output
```
(2*(a + b*Log[c*x^n])*Log[Sqrt[d] - Sqrt[d + e*x]] - 2*(a + b*Log[c*x^n])*
Log[Sqrt[d] + Sqrt[d + e*x]] - b*n*(Log[Sqrt[d] - Sqrt[d + e*x]]*(Log[Sqrt
[d] - Sqrt[d + e*x]] + 2*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2]) + 2*PolyLog[2
, 1/2 - Sqrt[d + e*x]/(2*Sqrt[d])]) + b*n*(Log[Sqrt[d] + Sqrt[d + e*x]]*(L
og[Sqrt[d] + Sqrt[d + e*x]] + 2*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])]) + 2*
PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2]))/(2*Sqrt[d])
```

3.148.3 Rubi [A] (verified)

Time = 0.61 (sec) , antiderivative size = 145, normalized size of antiderivative = 0.95, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.435$, Rules used = {2790, 27, 7267, 25, 6546, 27, 6470, 27, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \ 2790$$

$$-bn\int -\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}x}dx-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \ 27$$

$$\frac{2bn\int \frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \ 7267$$

$$\frac{4bn\int \frac{\sqrt{d+ex}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \ 25$$

$$-\frac{4bn\int -\frac{\sqrt{d+ex}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \ 6546$$

$$\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\frac{\int\frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \; 27$$

$$\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\int\frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \; 6470$$

$$\frac{4bn\left(\frac{\int-\frac{d\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \; 27$$

$$\frac{4bn\left(\sqrt{d}\int-\frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \; 2849$$

$$\frac{4bn\left(-\sqrt{d}\int\frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}}d\frac{1}{\sqrt{d}-\sqrt{d+ex}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \; 2752$$

$$\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

3.148. $\int\frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx$

input
```
Int[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x]),x]
```

output
```
(-2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[d] + (4*b*n*(A
rcTanh[Sqrt[d + e*x]/Sqrt[d]]^2/2 - ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*
Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])] - PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d]
- Sqrt[d + e*x])]/2))/Sqrt[d]
```

3.148.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

3.148.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(e*x+d)^(1/2),x)
```

3.148.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\sqrt{d+ex}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\sqrt{ex+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/(e*x^2 + d*x), x)
```

3.148.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx=\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*sqrt(d + e*x)), x)
```

3.148.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx=\int \frac{b\log(cx^n)+a}{\sqrt{ex+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
b*integrate((log(c) + log(x^n))/(sqrt(e*x + d)*x), x) + a*log((sqrt(e*x +
d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/sqrt(d)
```

3.148.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}\,dx=\int \frac{b\log(cx^n)+a}{\sqrt{ex+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*x), x)
```

3.148.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\sqrt{d+ex}}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\sqrt{d+e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^(1/2)), x)
```

3.149 $\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx$

3.149.1 Optimal result

Integrand size = 23, antiderivative size = 226

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx = -\frac{bn\sqrt{d+ex}}{dx} - \frac{ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}} - \frac{ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}} - \frac{\sqrt{d+ex}(a+b\log(cx^n))}{dx} + \frac{e\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}} + \frac{2ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{3/2}} + \frac{ben\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{3/2}}$$

output
```
-b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(3/2)-b*e*n*arctanh((e*x+d)^(1/2)/
d^(1/2))^2/d^(3/2)+e*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(3/2
)+2*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/
2)))/d^(3/2)+b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(3/2)-
b*n*(e*x+d)^(1/2)/d/x-(a+b*ln(c*x^n))*(e*x+d)^(1/2)/d/x
```

3.149.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 392, normalized size of antiderivative = 1.73

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx = -\frac{4a\sqrt{d}\sqrt{d+ex}+4b\sqrt{d}n\sqrt{d+ex}+4benx\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+4b\sqrt{d}\sqrt{d+ex}\log(cx^n)+2aex\log\left(\sqrt{d}-\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*Sqrt[d + e*x]),x]
```

output
```
-1/4*(4*a*Sqrt[d]*Sqrt[d + e*x] + 4*b*Sqrt[d]*n*Sqrt[d + e*x] + 4*b*e*n*x*
ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 4*b*Sqrt[d]*Sqrt[d + e*x]*Log[c*x^n] + 2*
a*e*x*Log[Sqrt[d] - Sqrt[d + e*x]] + 2*b*e*x*Log[c*x^n]*Log[Sqrt[d] - Sqrt
[d + e*x]] - b*e*n*x*Log[Sqrt[d] - Sqrt[d + e*x]]^2 - 2*a*e*x*Log[Sqrt[d]
+ Sqrt[d + e*x]] - 2*b*e*x*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] + b*e*n
*x*Log[Sqrt[d] + Sqrt[d + e*x]]^2 + 2*b*e*n*x*Log[Sqrt[d] + Sqrt[d + e*x]]
*Log[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])] - 2*b*e*n*x*Log[Sqrt[d] - Sqrt[d + e
*x]]*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2] - 2*b*e*n*x*PolyLog[2, 1/2 - Sqrt[
d + e*x]/(2*Sqrt[d])] + 2*b*e*n*x*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2
])/(d^(3/2)*x)
```

3.149.3 Rubi [A] (verified)

Time = 0.52 (sec) , antiderivative size = 220, normalized size of antiderivative = 0.97, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2792, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \; 2792$$

$$-bn\int -\frac{\frac{\sqrt{d+ex}}{d}-\frac{ex\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}}}{x^2}dx+\frac{e\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{dx}$$

$$\Big\downarrow \; 25$$

$$bn\int \frac{\frac{\sqrt{d+ex}}{d}-\frac{ex\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}}}{x^2}dx+\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{dx}$$

$$\Big\downarrow \text{2010}$$

$$bn\int \left(\frac{\sqrt{d+ex}}{dx^2}-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}x}\right)dx+\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{dx}$$

$$\Big\downarrow \text{2009}$$

$$\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{dx}+bn\left(-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}}-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}}+\frac{2e\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{3/2}}+\frac{e\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{3/2}}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*Sqrt[d + e*x]),x]
```

output
```
-((Sqrt[d + e*x]*(a + b*Log[c*x^n]))/(d*x)) + (e*ArcTanh[Sqrt[d + e*x]/Sqr
t[d]]*(a + b*Log[c*x^n]))/d^(3/2) + b*n*(-(Sqrt[d + e*x]/(d*x)) - (e*ArcTa
nh[Sqrt[d + e*x]/Sqrt[d]])/d^(3/2) - (e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2)/
d^(3/2) + (2*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - S
qrt[d + e*x])])/d^(3/2) + (e*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d
+ e*x])])/d^(3/2))
```

3.149.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.149.4 Maple [F]

$$\int \frac{a + b\ln (c\,x^{n})}{x^{2}\sqrt{ex + d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^(1/2),x)
```

3.149.5 Fricas [F]

$$\int \frac{a + b\log (cx^{n})}{x^{2}\sqrt{d + ex}}\,dx = \int \frac{b\log (cx^{n}) + a}{\sqrt{ex + d}x^{2}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/(e*x^3 + d*x^2), x
)
```

3.149.6 Sympy [F]

$$\int \frac{a + b\log (cx^{n})}{x^{2}\sqrt{d + ex}}\,dx = \int \frac{a + b\log (cx^{n})}{x^{2}\sqrt{d + ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*sqrt(d + e*x)), x)
```

3.149.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex+dx^2}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
-1/2*a*(2*sqrt(e*x + d)*e/((e*x + d)*d - d^2) + e*log((sqrt(e*x + d) - sqr
t(d))/(sqrt(e*x + d) + sqrt(d)))/d^(3/2)) + b*integrate((log(c) + log(x^n)
)/(sqrt(e*x + d)*x^2), x)
```

3.149.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex+dx^2}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*x^2), x)
```

3.149.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,\sqrt{d+e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^(1/2)), x)
```

3.150 $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx$

3.150.1 Optimal result

Integrand size = 23, antiderivative size = 304

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx &= -\frac{bn\sqrt{d+ex}}{4dx^2}+\frac{5ben\sqrt{d+ex}}{8d^2x}+\frac{7be^2n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{8d^{5/2}}\\&\quad+\frac{3be^2n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{4d^{5/2}}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2dx^2}\\&\quad+\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4d^2x}-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{5/2}}\\&\quad-\frac{3be^2n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{2d^{5/2}}\\&\quad-\frac{3be^2n\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{4d^{5/2}}\end{aligned}$$

output
```
7/8*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(5/2)+3/4*b*e^2*n*arctanh((e*
x+d)^(1/2)/d^(1/2))^2/d^(5/2)-3/4*e^2*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*
ln(c*x^n))/d^(5/2)-3/2*b*e^2*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)
/(d^(1/2)-(e*x+d)^(1/2)))/d^(5/2)-3/4*b*e^2*n*polylog(2,1-2*d^(1/2)/(d^(1/
2)-(e*x+d)^(1/2)))/d^(5/2)-1/4*b*n*(e*x+d)^(1/2)/d/x^2+5/8*b*e*n*(e*x+d)^(
1/2)/d^2/x-1/2*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/d/x^2+3/4*e*(a+b*ln(c*x^n))*(
e*x+d)^(1/2)/d^2/x
```

3.150.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 501, normalized size of antiderivative = 1.65

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx$$
$$= \frac{-8ad^{3/2}\sqrt{d+ex}-4bd^{3/2}n\sqrt{d+ex}+12a\sqrt{d}ex\sqrt{d+ex}+10b\sqrt{d}enx\sqrt{d+ex}+14be^2nx^2\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*Sqrt[d + e*x]),x]
```

output
```
(-8*a*d^(3/2)*Sqrt[d + e*x] - 4*b*d^(3/2)*n*Sqrt[d + e*x] + 12*a*Sqrt[d]*e
*x*Sqrt[d + e*x] + 10*b*Sqrt[d]*e*n*x*Sqrt[d + e*x] + 14*b*e^2*n*x^2*ArcTa
nh[Sqrt[d + e*x]/Sqrt[d]] - 8*b*d^(3/2)*Sqrt[d + e*x]*Log[c*x^n] + 12*b*Sq
rt[d]*e*x*Sqrt[d + e*x]*Log[c*x^n] + 6*a*e^2*x^2*Log[Sqrt[d] - Sqrt[d + e*
x]] + 6*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] - Sqrt[d + e*x]] - 3*b*e^2*n*x^2*
Log[Sqrt[d] - Sqrt[d + e*x]]^2 - 6*a*e^2*x^2*Log[Sqrt[d] + Sqrt[d + e*x]]
- 6*b*e^2*x^2*Log[c*x^n]*Log[Sqrt[d] + Sqrt[d + e*x]] + 3*b*e^2*n*x^2*Log[
Sqrt[d] + Sqrt[d + e*x]]^2 + 6*b*e^2*n*x^2*Log[Sqrt[d] + Sqrt[d + e*x]]*Lo
g[1/2 - Sqrt[d + e*x]/(2*Sqrt[d])] - 6*b*e^2*n*x^2*Log[Sqrt[d] - Sqrt[d +
e*x]]*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2] - 6*b*e^2*n*x^2*PolyLog[2, 1/2 -
Sqrt[d + e*x]/(2*Sqrt[d])] + 6*b*e^2*n*x^2*PolyLog[2, (1 + Sqrt[d + e*x]/S
qrt[d])/2])/(16*d^(5/2)*x^2)
```

3.150.3 Rubi [A] (verified)

Time = 0.62 (sec) , antiderivative size = 280, normalized size of antiderivative = 0.92, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \; 2792$$

$$-bn\int -\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)x^2+\sqrt{d}(2d-3ex)\sqrt{d+ex}}{4d^{5/2}x^3}dx-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{5/2}}+\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4d^2x}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow 27$$

$$\frac{bn\int \frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)x^2+\sqrt{d}(2d-3ex)\sqrt{d+ex}}{x^3}dx}{4d^{5/2}}-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{5/2}}+\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4d^2x}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow 2010$$

$$\frac{bn\int \left(\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)e^2}{x}-\frac{3\sqrt{d}\sqrt{d+ex}e}{x^2}+\frac{2d^{3/2}\sqrt{d+ex}}{x^3}\right)dx}{4d^{5/2}}-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{5/2}}+\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4d^2x}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow 2009$$

$$-\frac{3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{4d^{5/2}}+\frac{3e\sqrt{d+ex}(a+b\log(cx^n))}{4d^2x}-\frac{\sqrt{d+ex}(a+b\log(cx^n))}{2dx^2}+\frac{bn\left(3e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2+\frac{7}{2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)-6e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\frac{d^{3/2}\sqrt{d+ex}}{x^2}-3e^2\,\text{PolyL}}{4d^{5/2}}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*Sqrt[d + e*x]),x]
```

output
```
-1/2*(Sqrt[d + e*x]*(a + b*Log[c*x^n]))/(d*x^2) + (3*e*Sqrt[d + e*x]*(a +
b*Log[c*x^n]))/(4*d^2*x) - (3*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Lo
g[c*x^n]))/(4*d^(5/2)) + (b*n*(-((d^(3/2)*Sqrt[d + e*x])/x^2) + (5*Sqrt[d]
*e*Sqrt[d + e*x])/(2*x) + (7*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/2 + 3*e^2
*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2 - 6*e^2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*L
og[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])] - 3*e^2*PolyLog[2, 1 - (2*Sqrt[d
])/(Sqrt[d] - Sqrt[d + e*x])]))/(4*d^(5/2))
```

3.150. $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx$

3.150.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.150.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{3}\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(e*x+d)^(1/2),x)
```

3.150.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\sqrt{d+ex}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\sqrt{ex+d}x^{3}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/(e*x^4 + d*x^3), x
)
```

3.150.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx = \int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**3*sqrt(d + e*x)), x)
```

3.150.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex+d}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^(1/2),x, algorithm="maxima")
```

output
```
1/8*a*(3*e^2*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/d^(5
/2) + 2*(3*(e*x + d)^(3/2)*e^2 - 5*sqrt(e*x + d)*d*e^2)/((e*x + d)^2*d^2 -
 2*(e*x + d)*d^3 + d^4)) + b*integrate((log(c) + log(x^n))/(sqrt(e*x + d)*
x^3), x)
```

3.150.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex+d}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*x^3), x)
```

3.150.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\sqrt{d+ex}}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,\sqrt{d+e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^(1/2)), x)
```

3.151 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx$

3.151.1 Optimal result

Integrand size = 23, antiderivative size = 194

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = -\frac{44bd^2n\sqrt{d+ex}}{5e^4}+\frac{16bdn(d+ex)^{3/2}}{15e^4}-\frac{4bn(d+ex)^{5/2}}{25e^4}+\frac{64bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{5e^4}+\frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^4}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}$$

output
```
16/15*b*d*n*(e*x+d)^(3/2)/e^4-4/25*b*n*(e*x+d)^(5/2)/e^4+64/5*b*d^(5/2)*n*
arctanh((e*x+d)^(1/2)/d^(1/2))/e^4-2*d*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^4+2
/5*(e*x+d)^(5/2)*(a+b*ln(c*x^n))/e^4+2*d^3*(a+b*ln(c*x^n))/e^4/(e*x+d)^(1/
2)-44/5*b*d^2*n*(e*x+d)^(1/2)/e^4+6*d^2*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/e^4
```

3.151.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 159, normalized size of antiderivative = 0.82

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \frac{480ad^3-592bd^3n+240ad^2ex-536bd^2enx-60ade^2x^2+44bde^2nx^2+30ae^3x^3}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

output
```
(480*a*d^3 - 592*b*d^3*n + 240*a*d^2*e*x - 536*b*d^2*e*n*x - 60*a*d*e^2*x^
2 + 44*b*d*e^2*n*x^2 + 30*a*e^3*x^3 - 12*b*e^3*n*x^3 + 960*b*d^(5/2)*n*Sqr
t[d + e*x]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + 30*b*(16*d^3 + 8*d^2*e*x - 2*d
*e^2*x^2 + e^3*x^3)*Log[c*x^n])/(75*e^4*Sqrt[d + e*x])
```

3.151.3 Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 180, normalized size of antiderivative = 0.93, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2792, 27, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int \frac{2(16d^3+8exd^2-2e^2x^2d+e^3x^3)}{5e^4x\sqrt{d+ex}}dx+\frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^4}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \text{ 27}$$

$$-\frac{2bn\int \frac{16d^3+8exd^2-2e^2x^2d+e^3x^3}{x\sqrt{d+ex}}dx}{5e^4}+\frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^4}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \text{ 2123}$$

$$-\frac{2bn\int \left(\frac{16d^3}{x\sqrt{d+ex}}+\frac{11ed^2}{\sqrt{d+ex}}-4e\sqrt{d+ex}d+e(d+ex)^{3/2}\right)dx}{5e^4}+\frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^4}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{2d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}(a+b\log(cx^n))}{e^4}-\frac{2d(d+ex)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{2(d+ex)^{5/2}(a+b\log(cx^n))}{5e^4}-\frac{2bn\left(-32d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+22d^2\sqrt{d+ex}-\frac{8}{3}d(d+ex)^{3/2}+\frac{2}{5}(d+ex)^{5/2}\right)}{5e^4}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

output
```
(-2*b*n*(22*d^2*Sqrt[d + e*x] - (8*d*(d + e*x)^(3/2))/3 + (2*(d + e*x)^(5/
2))/5 - 32*d^(5/2)*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/(5*e^4) + (2*d^3*(a +
b*Log[c*x^n]))/(e^4*Sqrt[d + e*x]) + (6*d^2*Sqrt[d + e*x]*(a + b*Log[c*x^n
]))/e^4 - (2*d*(d + e*x)^(3/2)*(a + b*Log[c*x^n]))/e^4 + (2*(d + e*x)^(5/2
)*(a + b*Log[c*x^n]))/(5*e^4)
```

3.151.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.151.4 Maple [F]

$$\int \frac{x^3(a+b\ln(c\,x^n))}{(ex+d)^{\frac{3}{2}}}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

3.151.5 Fricas [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 435, normalized size of antiderivative = 2.24

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \left[\frac{2\left(240\,(bd^2enx+bd^3n)\sqrt{d}\log\left(\frac{ex+2\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)-(296\,bd^3n-240\,ad^3+3\,(2\right.}{}\right.$$

$$-\frac{2\left(480\,(bd^2enx+bd^3n)\sqrt{-d}\arctan\left(\frac{\sqrt{ex+d}\sqrt{-d}}{d}\right)+(296\,bd^3n-240\,ad^3+3\,(2\,be^3n-5\,ae^3)x^3-2\,(11\,bde^2\right.}{}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="fricas")
```

output
```
[2/75*(240*(b*d^2*e*n*x + b*d^3*n)*sqrt(d)*log((e*x + 2*sqrt(e*x + d)*sqrt
(d) + 2*d)/x) - (296*b*d^3*n - 240*a*d^3 + 3*(2*b*e^3*n - 5*a*e^3)*x^3 - 2
*(11*b*d*e^2*n - 15*a*d*e^2)*x^2 + 4*(67*b*d^2*e*n - 30*a*d^2*e)*x - 15*(b
*e^3*x^3 - 2*b*d*e^2*x^2 + 8*b*d^2*e*x + 16*b*d^3)*log(c) - 15*(b*e^3*n*x^
3 - 2*b*d*e^2*n*x^2 + 8*b*d^2*e*n*x + 16*b*d^3*n)*log(x))*sqrt(e*x + d))/(
e^5*x + d*e^4), -2/75*(480*(b*d^2*e*n*x + b*d^3*n)*sqrt(-d)*arctan(sqrt(e*
x + d)*sqrt(-d)/d) + (296*b*d^3*n - 240*a*d^3 + 3*(2*b*e^3*n - 5*a*e^3)*x^
3 - 2*(11*b*d*e^2*n - 15*a*d*e^2)*x^2 + 4*(67*b*d^2*e*n - 30*a*d^2*e)*x -
15*(b*e^3*x^3 - 2*b*d*e^2*x^2 + 8*b*d^2*e*x + 16*b*d^3)*log(c) - 15*(b*e^3
*n*x^3 - 2*b*d*e^2*n*x^2 + 8*b*d^2*e*n*x + 16*b*d^3*n)*log(x))*sqrt(e*x +
d))/(e^5*x + d*e^4)]
```

3.151.6 Sympy [A] (verification not implemented)

Time = 116.99 (sec) , antiderivative size = 369, normalized size of antiderivative = 1.90

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = a\left(\begin{cases}\frac{2d^3}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}}{e^4}-\frac{2d(d+ex)^{\frac{3}{2}}}{e^4}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^4} & \text{for } e\neq 0\\ \frac{x^4}{4d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)$$

$$-bn\left(\begin{cases}-\frac{308d^{\frac{5}{2}}\sqrt{1+\frac{ex}{d}}}{75e^4}-\frac{8d^{\frac{5}{2}}\log\left(\frac{ex}{d}\right)}{5e^4}+\frac{16d^{\frac{5}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{5e^4}-\frac{16d^{\frac{5}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e^4}-\frac{56d^{\frac{3}{2}}x\sqrt{1+\frac{ex}{d}}}{75e^3}+\frac{4\sqrt{d}x^2\sqrt{1+\frac{ex}{d}}}{25e^2}+\frac{}{e^{\frac{9}{2}}} \\ \frac{x^4}{16d^{\frac{3}{2}}}\end{cases}\right.$$

$$+b\left(\begin{cases}\frac{2d^3}{e^4\sqrt{d+ex}}+\frac{6d^2\sqrt{d+ex}}{e^4}-\frac{2d(d+ex)^{\frac{3}{2}}}{e^4}+\frac{2(d+ex)^{\frac{5}{2}}}{5e^4} & \text{for } e\neq 0\\ \frac{x^4}{4d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x+d)**(3/2),x)
```

output
```
a*Piecewise((2*d**3/(e**4*sqrt(d + e*x)) + 6*d**2*sqrt(d + e*x)/e**4 - 2*d
*(d + e*x)**(3/2)/e**4 + 2*(d + e*x)**(5/2)/(5*e**4), Ne(e, 0)), (x**4/(4*
d**(3/2)), True)) - b*n*Piecewise((-308*d**(5/2)*sqrt(1 + e*x/d)/(75*e**4)
 - 8*d**(5/2)*log(e*x/d)/(5*e**4) + 16*d**(5/2)*log(sqrt(1 + e*x/d) + 1)/(
5*e**4) - 16*d**(5/2)*asinh(sqrt(d)/(sqrt(e)*sqrt(x)))/e**4 - 56*d**(3/2)*
x*sqrt(1 + e*x/d)/(75*e**3) + 4*sqrt(d)*x**2*sqrt(1 + e*x/d)/(25*e**2) + 1
2*d**3/(e**(9/2)*sqrt(x)*sqrt(d/(e*x) + 1)) + 12*d**2*sqrt(x)/(e**(7/2)*sq
rt(d/(e*x) + 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**4/(16*d**(3/2)), T
rue)) + b*Piecewise((2*d**3/(e**4*sqrt(d + e*x)) + 6*d**2*sqrt(d + e*x)/e*
*4 - 2*d*(d + e*x)**(3/2)/e**4 + 2*(d + e*x)**(5/2)/(5*e**4), Ne(e, 0)), (
x**4/(4*d**(3/2)), True))*log(c*x**n)
```

3.151.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 200, normalized size of antiderivative = 1.03

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = -\frac{4}{75}\,bn\left(\frac{120\,d^{\frac{5}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^4}+\frac{3\,(ex+d)^{\frac{5}{2}}-20\,(ex+d)^{\frac{3}{2}}d+165\,\sqrt{ex+d}d^2}{e^4}\right) + \frac{2}{5}\,b\left(\frac{(ex+d)^{\frac{5}{2}}}{e^4}-\frac{5\,(ex+d)^{\frac{3}{2}}d}{e^4}+\frac{15\,\sqrt{ex+d}d^2}{e^4}+\frac{5\,d^3}{\sqrt{ex+d}e^4}\right)\log(cx^n) + \frac{2}{5}\,a\left(\frac{(ex+d)^{\frac{5}{2}}}{e^4}-\frac{5\,(ex+d)^{\frac{3}{2}}d}{e^4}+\frac{15\,\sqrt{ex+d}d^2}{e^4}+\frac{5\,d^3}{\sqrt{ex+d}e^4}\right)$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="maxima")
```

output
```
-4/75*b*n*(120*d^(5/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt
(d)))/e^4 + (3*(e*x + d)^(5/2) - 20*(e*x + d)^(3/2)*d + 165*sqrt(e*x + d)*
d^2)/e^4) + 2/5*b*((e*x + d)^(5/2)/e^4 - 5*(e*x + d)^(3/2)*d/e^4 + 15*sqrt
(e*x + d)*d^2/e^4 + 5*d^3/(sqrt(e*x + d)*e^4))*log(c*x^n) + 2/5*a*((e*x +
d)^(5/2)/e^4 - 5*(e*x + d)^(3/2)*d/e^4 + 15*sqrt(e*x + d)*d^2/e^4 + 5*d^3/
(sqrt(e*x + d)*e^4))
```

3.151.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x + d)^(3/2), x)
```

3.151.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^{3/2}}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^(3/2),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x)^(3/2), x)
```

3.152 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx$

3.152.1 Optimal result

Integrand size = 23, antiderivative size = 146

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \frac{20bdn\sqrt{d+ex}}{3e^3}-\frac{4bn(d+ex)^{3/2}}{9e^3}-\frac{32bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{3e^3}-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

output
```
-4/9*b*n*(e*x+d)^(3/2)/e^3-32/3*b*d^(3/2)*n*arctanh((e*x+d)^(1/2)/d^(1/2))
/e^3+2/3*(e*x+d)^(3/2)*(a+b*ln(c*x^n))/e^3-2*d^2*(a+b*ln(c*x^n))/e^3/(e*x+
d)^(1/2)+20/3*b*d*n*(e*x+d)^(1/2)/e^3-4*d*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/e^
3
```

3.152.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 124, normalized size of antiderivative = 0.85

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \frac{-48ad^2+56bd^2n-24adex+52bdenx+6ae^2x^2-4be^2nx^2-96bd^{3/2}n\sqrt{d+ex}}{9e^3\sqrt{d+ex}}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

output
```
(-48*a*d^2 + 56*b*d^2*n - 24*a*d*e*x + 52*b*d*e*n*x + 6*a*e^2*x^2 - 4*b*e^
2*n*x^2 - 96*b*d^(3/2)*n*Sqrt[d + e*x]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] - 6*
b*(8*d^2 + 4*d*e*x - e^2*x^2)*Log[c*x^n])/(9*e^3*Sqrt[d + e*x])
```

3.152.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 146, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2792, 27, 1192, 25, 1467, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{2(8d^2+4exd-e^2x^2)}{3e^3x\sqrt{d+ex}}dx-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{2bn\int \frac{8d^2+4exd-e^2x^2}{x\sqrt{d+ex}}dx}{3e^3}-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1192}$$

$$\frac{4bn\int \frac{3d^2e^2-(d+ex)^2e^2+6d(d+ex)e^2}{ex}d\sqrt{d+ex}}{3e^5}-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{25}$$

$$-\frac{4bn\int -\frac{3d^2e^2-(d+ex)^2e^2+6d(d+ex)e^2}{ex}d\sqrt{d+ex}}{3e^5}-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1467}$$

$$-\frac{4bn\int\left(-\frac{8ed^2}{x}-5e^2d+e^2(d+ex)\right)d\sqrt{d+ex}}{3e^5}-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex}}-\frac{4d\sqrt{d+ex}(a+b\log(cx^n))}{e^3}+\frac{2(d+ex)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{4bn\left(-8d^{3/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)-\frac{1}{3}e^2(d+ex)^{3/2}+5de^2\sqrt{d+ex}\right)}{3e^5}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

output
```
(4*b*n*(5*d*e^2*Sqrt[d + e*x] - (e^2*(d + e*x)^(3/2))/3 - 8*d^(3/2)*e^2*Ar
cTanh[Sqrt[d + e*x]/Sqrt[d]]))/(3*e^5) - (2*d^2*(a + b*Log[c*x^n]))/(e^3*S
qrt[d + e*x]) - (4*d*Sqrt[d + e*x]*(a + b*Log[c*x^n]))/e^3 + (2*(d + e*x)^
(3/2)*(a + b*Log[c*x^n]))/(3*e^3)
```

3.152.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1467
```
Int[((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.),
 x_Symbol] :> Int[ExpandIntegrand[(d + e*x^2)^q*(a + b*x^2 + c*x^4)^p, x],
x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e
 + a*e^2, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.152.4 Maple [F]

$$\int \frac{x^2(a+b\ln(c\,x^n))}{(ex+d)^{\frac{3}{2}}}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

3.152.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 330, normalized size of antiderivative = 2.26

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \left[\frac{2\left(24\,(bdenx+bd^2n)\sqrt{d}\log\left(\frac{ex-2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)+(28\,bd^2n-24\,ad^2-(2\,be^2n\right.}{}\right.$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="fricas")
```

output
```
[2/9*(24*(b*d*e*n*x + b*d^2*n)*sqrt(d)*log((e*x - 2*sqrt(e*x + d)*sqrt(d)
+ 2*d)/x) + (28*b*d^2*n - 24*a*d^2 - (2*b*e^2*n - 3*a*e^2)*x^2 + 2*(13*b*d
*e*n - 6*a*d*e)*x + 3*(b*e^2*x^2 - 4*b*d*e*x - 8*b*d^2)*log(c) + 3*(b*e^2*
n*x^2 - 4*b*d*e*n*x - 8*b*d^2*n)*log(x))*sqrt(e*x + d))/(e^4*x + d*e^3), 2
/9*(48*(b*d*e*n*x + b*d^2*n)*sqrt(-d)*arctan(sqrt(e*x + d)*sqrt(-d)/d) + (
28*b*d^2*n - 24*a*d^2 - (2*b*e^2*n - 3*a*e^2)*x^2 + 2*(13*b*d*e*n - 6*a*d*
e)*x + 3*(b*e^2*x^2 - 4*b*d*e*x - 8*b*d^2)*log(c) + 3*(b*e^2*n*x^2 - 4*b*d
*e*n*x - 8*b*d^2*n)*log(x))*sqrt(e*x + d))/(e^4*x + d*e^3)]
```

3.152.6 Sympy [A] (verification not implemented)

Time = 135.75 (sec) , antiderivative size = 308, normalized size of antiderivative = 2.11

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = a\left(\begin{cases} -\frac{2d^2}{e^3\sqrt{d+ex}} - \frac{4d\sqrt{d+ex}}{e^3} + \frac{2(d+ex)^{\frac{3}{2}}}{3e^3} & \text{for } e \neq 0 \\ \frac{x^3}{3d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right)$$
$$-bn\left(\begin{cases} \frac{16d^{\frac{3}{2}}\sqrt{1+\frac{ex}{d}}}{9e^3} + \frac{2d^{\frac{3}{2}}\log\left(\frac{ex}{d}\right)}{3e^3} - \frac{4d^{\frac{3}{2}}\log\left(\sqrt{1+\frac{ex}{d}}+1\right)}{3e^3} + \frac{12d^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e^3} + \frac{4\sqrt{d}x\sqrt{1+\frac{ex}{d}}}{9e^2} - \frac{8d^2}{e^{\frac{7}{2}}\sqrt{x}\sqrt{\frac{d}{ex}+1}} - \frac{8d\sqrt{x}}{e^{\frac{5}{2}}\sqrt{\frac{d}{ex}+1}} \\ \frac{x^3}{9d^{\frac{3}{2}}} \end{cases}\right)$$
$$+b\left(\begin{cases} -\frac{2d^2}{e^3\sqrt{d+ex}} - \frac{4d\sqrt{d+ex}}{e^3} + \frac{2(d+ex)^{\frac{3}{2}}}{3e^3} & \text{for } e \neq 0 \\ \frac{x^3}{3d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x+d)**(3/2),x)
```

output
```
a*Piecewise((-2*d**2/(e**3*sqrt(d + e*x)) - 4*d*sqrt(d + e*x)/e**3 + 2*(d
+ e*x)**(3/2)/(3*e**3), Ne(e, 0)), (x**3/(3*d**(3/2)), True)) - b*n*Piecew
ise((16*d**(3/2)*sqrt(1 + e*x/d)/(9*e**3) + 2*d**(3/2)*log(e*x/d)/(3*e**3)
 - 4*d**(3/2)*log(sqrt(1 + e*x/d) + 1)/(3*e**3) + 12*d**(3/2)*asinh(sqrt(d
)/(sqrt(e)*sqrt(x)))/e**3 + 4*sqrt(d)*x*sqrt(1 + e*x/d)/(9*e**2) - 8*d**2/
(e**(7/2)*sqrt(x)*sqrt(d/(e*x) + 1)) - 8*d*sqrt(x)/(e**(5/2)*sqrt(d/(e*x)
+ 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**3/(9*d**(3/2)), True)) + b*Pi
ecewise((-2*d**2/(e**3*sqrt(d + e*x)) - 4*d*sqrt(d + e*x)/e**3 + 2*(d + e*
x)**(3/2)/(3*e**3), Ne(e, 0)), (x**3/(3*d**(3/2)), True))*log(c*x**n)
```

3.152.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 157, normalized size of antiderivative = 1.08

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \frac{4}{9}\,bn\left(\frac{12\,d^{\frac{3}{2}}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^3} - \frac{(ex+d)^{\frac{3}{2}} - 15\sqrt{ex+d}d}{e^3}\right)$$
$$+\frac{2}{3}\,b\left(\frac{(ex+d)^{\frac{3}{2}}}{e^3} - \frac{6\sqrt{ex+d}d}{e^3} - \frac{3\,d^2}{\sqrt{ex+d}e^3}\right)\log(cx^n)$$
$$+\frac{2}{3}\,a\left(\frac{(ex+d)^{\frac{3}{2}}}{e^3} - \frac{6\sqrt{ex+d}d}{e^3} - \frac{3\,d^2}{\sqrt{ex+d}e^3}\right)$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="maxima")
```

output
```
4/9*b*n*(12*d^(3/2)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)
))/e^3 - ((e*x + d)^(3/2) - 15*sqrt(e*x + d)*d)/e^3) + 2/3*b*((e*x + d)^(3
/2)/e^3 - 6*sqrt(e*x + d)*d/e^3 - 3*d^2/(sqrt(e*x + d)*e^3))*log(c*x^n) +
2/3*a*((e*x + d)^(3/2)/e^3 - 6*sqrt(e*x + d)*d/e^3 - 3*d^2/(sqrt(e*x + d)*
e^3))
```

3.152.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x + d)^(3/2), x)
```

3.152.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^{3/2}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^(3/2),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x)^(3/2), x)
```

3.153 $\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx$

3.153.1 Optimal result

Integrand size = 21, antiderivative size = 94

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = -\frac{4bn\sqrt{d+ex}}{e^2} + \frac{8b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{e^2} + \frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}} + \frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e^2}$$

output
```
8*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*d^(1/2)/e^2+2*d*(a+b*ln(c*x^n))/e^2/(
e*x+d)^(1/2)-4*b*n*(e*x+d)^(1/2)/e^2+2*(a+b*ln(c*x^n))*(e*x+d)^(1/2)/e^2
```

3.153.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 83, normalized size of antiderivative = 0.88

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \frac{2\left(2ad-2bdn+aex-2benx+4b\sqrt{d}n\sqrt{d+ex}\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+b(2d+ex)\log\right.}{e^2\sqrt{d+ex}}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

output
```
(2*(2*a*d - 2*b*d*n + a*e*x - 2*b*e*n*x + 4*b*Sqrt[d]*n*Sqrt[d + e*x]*ArcT
anh[Sqrt[d + e*x]/Sqrt[d]] + b*(2*d + e*x)*Log[c*x^n]))/(e^2*Sqrt[d + e*x]
)
```

3.153.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 92, normalized size of antiderivative = 0.98, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {2792, 27, 90, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{2(2d+ex)}{e^2x\sqrt{d+ex}}dx+\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e^2}+\frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}}$$

$$\Big\downarrow \text{27}$$

$$-\frac{2bn\int \frac{2d+ex}{x\sqrt{d+ex}}dx}{e^2}+\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e^2}+\frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}}$$

$$\Big\downarrow \text{90}$$

$$-\frac{2bn\left(2d\int \frac{1}{x\sqrt{d+ex}}dx+2\sqrt{d+ex}\right)}{e^2}+\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e^2}+\frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}}$$

$$\Big\downarrow \text{73}$$

$$-\frac{2bn\left(\frac{4d\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e}+2\sqrt{d+ex}\right)}{e^2}+\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e^2}+\frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}}$$

$$\Big\downarrow \text{221}$$

$$\frac{2\sqrt{d+ex}(a+b\log(cx^n))}{e^2}+\frac{2d(a+b\log(cx^n))}{e^2\sqrt{d+ex}}-\frac{2bn\left(2\sqrt{d+ex}-4\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\right)}{e^2}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x)^(3/2),x]
```

output
```
(-2*b*n*(2*Sqrt[d + e*x] - 4*Sqrt[d]*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]))/e^2
+ (2*d*(a + b*Log[c*x^n]))/(e^2*Sqrt[d + e*x]) + (2*Sqrt[d + e*x]*(a + b*L
og[c*x^n]))/e^2
```

3.153.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.153.4 Maple [F]

$$\int \frac{x(a + b\ln(c\,x^n))}{(ex + d)^{\frac{3}{2}}}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

3.153.5 Fricas [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 223, normalized size of antiderivative = 2.37

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \left[\frac{2\left(2\,(benx+bdn)\sqrt{d}\log\left(\frac{ex+2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)-(2\,bdn-2\,ad+(2\,ben-ae)x-\right.}{e^3x+de^2}\right.$$

$$-\frac{2\left(4\,(benx+bdn)\sqrt{-d}\arctan\left(\frac{\sqrt{ex+d}\sqrt{-d}}{d}\right)+(2\,bdn-2\,ad+(2\,ben-ae)x-(bex+2\,bd)\log(c)-(benx\right.}{e^3x+de^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="fricas")
```

output
```
[2*(2*(b*e*n*x + b*d*n)*sqrt(d)*log((e*x + 2*sqrt(e*x + d)*sqrt(d) + 2*d)/
x) - (2*b*d*n - 2*a*d + (2*b*e*n - a*e)*x - (b*e*x + 2*b*d)*log(c) - (b*e*
n*x + 2*b*d*n)*log(x))*sqrt(e*x + d))/(e^3*x + d*e^2), -2*(4*(b*e*n*x + b*
d*n)*sqrt(-d)*arctan(sqrt(e*x + d)*sqrt(-d)/d) + (2*b*d*n - 2*a*d + (2*b*e
*n - a*e)*x - (b*e*x + 2*b*d)*log(c) - (b*e*n*x + 2*b*d*n)*log(x))*sqrt(e*
x + d))/(e^3*x + d*e^2)]
```

3.153.6 Sympy [A] (verification not implemented)

Time = 91.74 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.88

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = a\left(\begin{cases}\frac{2d}{e^2\sqrt{d+ex}}+\frac{2\sqrt{d+ex}}{e^2} & \text{for } e\neq 0\\ \frac{x^2}{2d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases}-\frac{8\sqrt{d}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{e^2}+\frac{4d}{e^{\frac{5}{2}}\sqrt{x}\sqrt{\frac{d}{ex}+1}}+\frac{4\sqrt{x}}{e^{\frac{3}{2}}\sqrt{\frac{d}{ex}+1}} & \text{for } e>-\infty\wedge e<\infty\wedge e\neq 0\\ \frac{x^2}{4d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)$$
$$+b\left(\begin{cases}\frac{2d}{e^2\sqrt{d+ex}}+\frac{2\sqrt{d+ex}}{e^2} & \text{for } e\neq 0\\ \frac{x^2}{2d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x+d)**(3/2),x)
```

output
```
a*Piecewise((2*d/(e**2*sqrt(d + e*x)) + 2*sqrt(d + e*x)/e**2, Ne(e, 0)), (
x**2/(2*d**(3/2)), True)) - b*n*Piecewise((-8*sqrt(d)*asinh(sqrt(d)/(sqrt(
e)*sqrt(x)))/e**2 + 4*d/(e**(5/2)*sqrt(x)*sqrt(d/(e*x) + 1)) + 4*sqrt(x)/(
e**(3/2)*sqrt(d/(e*x) + 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**2/(4*d*
*(3/2)), True)) + b*Piecewise((2*d/(e**2*sqrt(d + e*x)) + 2*sqrt(d + e*x)/
e**2, Ne(e, 0)), (x**2/(2*d**(3/2)), True))*log(c*x**n)
```

3.153.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.19

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = -4\,bn\left(\frac{\sqrt{d}\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{e^2}+\frac{\sqrt{ex+d}}{e^2}\right) + 2\,b\left(\frac{\sqrt{ex+d}}{e^2}+\frac{d}{\sqrt{ex+d}e^2}\right)\log(cx^n)+2\,a\left(\frac{\sqrt{ex+d}}{e^2}+\frac{d}{\sqrt{ex+d}e^2}\right)$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="maxima")
```

output
```
-4*b*n*(sqrt(d)*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/e
^2 + sqrt(e*x + d)/e^2) + 2*b*(sqrt(e*x + d)/e^2 + d/(sqrt(e*x + d)*e^2))*
log(c*x^n) + 2*a*(sqrt(e*x + d)/e^2 + d/(sqrt(e*x + d)*e^2))
```

3.153.8 Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \int \frac{(b\log(cx^n)+a)x}{(ex+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x + d)^(3/2), x)
```

3.153.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex)^{3/2}}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{(d+e\,x)^{3/2}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^(3/2),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x)^(3/2), x)
```

3.154 $\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx$

3.154.1 Optimal result

Integrand size = 20, antiderivative size = 53

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx=-\frac{4bn\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}$$

output
```
-4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))/e/d^(1/2)-2*(a+b*ln(c*x^n))/e/(e*x+d
)^(1/2)
```

3.154.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.00

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx=-\frac{4bn\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x)^(3/2),x]
```

output
```
(-4*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(Sqrt[d]*e) - (2*(a + b*Log[c*x^n]
))/(e*Sqrt[d + e*x])
```

3.154.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.150, Rules used = {2756, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}dx$$

$$\Big\downarrow \text{ 2756}$$

$$\frac{2bn\int \frac{1}{x\sqrt{d+ex}}dx}{e}-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 73}$$

$$\frac{4bn\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e^2}-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 221}$$

$$-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x)^(3/2),x]
```

output
```
(-4*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(Sqrt[d]*e) - (2*(a + b*Log[c*x^n]
))/(e*Sqrt[d + e*x])
```

3.154.3.1 Defintions of rubi rules used

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

3.154.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\left(ex+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/(e*x+d)^(3/2),x)
```

3.154.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 155, normalized size of antiderivative = 2.92

$$\int \frac{a+b\log\left(cx^{n}\right)}{(d+ex)^{3/2}}\,dx = \left[\frac{2\left(\left(benx+bdn\right)\sqrt{d}\log\left(\frac{ex-2\,\sqrt{ex+d}\sqrt{d}+2\,d}{x}\right)-\left(bdn\log\left(x\right)+bd\log\left(c\right)+ad\right)\sqrt{ex+d}\right)}{de^{2}x+d^{2}e}\right.$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="fricas")
```

output
```
[2*((b*e*n*x + b*d*n)*sqrt(d)*log((e*x - 2*sqrt(e*x + d)*sqrt(d) + 2*d)/x)
 - (b*d*n*log(x) + b*d*log(c) + a*d)*sqrt(e*x + d))/(d*e^2*x + d^2*e), 2*(
2*(b*e*n*x + b*d*n)*sqrt(-d)*arctan(sqrt(e*x + d)*sqrt(-d)/d) - (b*d*n*log
(x) + b*d*log(c) + a*d)*sqrt(e*x + d))/(d*e^2*x + d^2*e)]
```

3.154.6 Sympy [A] (verification not implemented)

Time = 3.85 (sec) , antiderivative size = 88, normalized size of antiderivative = 1.66

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx = a\left(\begin{cases} -\frac{2}{e\sqrt{d+ex}} & \text{for } e\neq 0 \\ \frac{x}{d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right) - bn\left(\begin{cases} \frac{4\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right)}{\sqrt{d}e} & \text{for } e>-\infty \wedge e<\infty \wedge e\neq 0 \\ \frac{x}{d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right) + b\left(\begin{cases} -\frac{2}{e\sqrt{d+ex}} & \text{for } e\neq 0 \\ \frac{x}{d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate((a+b*ln(c*x**n))/(e*x+d)**(3/2),x)
```

output
```
a*Piecewise((-2/(e*sqrt(d + e*x)), Ne(e, 0)), (x/d**(3/2), True)) - b*n*Pi
ecewise((4*asinh(sqrt(d)/(sqrt(e)*sqrt(x)))/(sqrt(d)*e), (e > -oo) & (e <
oo) & Ne(e, 0)), (x/d**(3/2), True)) + b*Piecewise((-2/(e*sqrt(d + e*x)),
Ne(e, 0)), (x/d**(3/2), True))*log(c*x**n)
```

3.154.7 Maxima [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.34

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx = \frac{2\,bn\log\left(\frac{\sqrt{ex+d}-\sqrt{d}}{\sqrt{ex+d}+\sqrt{d}}\right)}{\sqrt{d}e} - \frac{2\,b\log(cx^n)}{\sqrt{ex+d}e} - \frac{2\,a}{\sqrt{ex+d}e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="maxima")
```

output
```
2*b*n*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/(sqrt(d)*e)
 - 2*b*log(c*x^n)/(sqrt(e*x + d)*e) - 2*a/(sqrt(e*x + d)*e)
```

3.154.8 Giac [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.34

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx = \frac{4\,bn\arctan\left(\frac{\sqrt{ex+d}}{\sqrt{-d}}\right)}{\sqrt{-d}e} - \frac{2\,bn\log(ex)}{\sqrt{ex+d}e} + \frac{2\,(bn\log(e) - b\log(c) - a)}{\sqrt{ex+d}e}$$

input
```
integrate((a+b*log(c*x^n))/(e*x+d)^(3/2),x, algorithm="giac")
```

output
```
4*b*n*arctan(sqrt(e*x + d)/sqrt(-d))/(sqrt(-d)*e) - 2*b*n*log(e*x)/(sqrt(e
*x + d)*e) + 2*(b*n*log(e) - b*log(c) - a)/(sqrt(e*x + d)*e)
```

3.154.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{(d+e\,x)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x)^(3/2),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x)^(3/2), x)
```

3.155 $\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx$

3.155.1 Optimal result

Integrand size = 23, antiderivative size = 201

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx = \frac{4bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{3/2}} + \frac{2bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{3/2}} + \frac{2(a+b\log(cx^n))}{d\sqrt{d+ex}} - \frac{2\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}} - \frac{4bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{3/2}} - \frac{2bn\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{3/2}}$$

output
```
4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(3/2)+2*b*n*arctanh((e*x+d)^(1/2)/d
^(1/2))^2/d^(3/2)-2*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(3/2)
-4*b*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2))
)/d^(3/2)-2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/d^(3/2)+2*(
a+b*ln(c*x^n))/d/(e*x+d)^(1/2)
```

3.155.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 295, normalized size of antiderivative = 1.47

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx = \frac{8bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+\frac{4\sqrt{d}(a+b\log(cx^n))}{\sqrt{d+ex}}+2(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right)-2(}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x)^(3/2)),x]
```

output
```
(8*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]] + (4*Sqrt[d]*(a + b*Log[c*x^n]))/Sqr
t[d + e*x] + 2*(a + b*Log[c*x^n])*Log[Sqrt[d] - Sqrt[d + e*x]] - 2*(a + b*
Log[c*x^n])*Log[Sqrt[d] + Sqrt[d + e*x]] - b*n*(Log[Sqrt[d] - Sqrt[d + e*x
]]*(Log[Sqrt[d] - Sqrt[d + e*x]] + 2*Log[(1 + Sqrt[d + e*x]/Sqrt[d])/2]) +
 2*PolyLog[2, 1/2 - Sqrt[d + e*x]/(2*Sqrt[d])]) + b*n*(Log[Sqrt[d] + Sqrt[
d + e*x]]*(Log[Sqrt[d] + Sqrt[d + e*x]] + 2*Log[1/2 - Sqrt[d + e*x]/(2*Sqr
t[d])]) + 2*PolyLog[2, (1 + Sqrt[d + e*x]/Sqrt[d])/2]))/(2*d^(3/2))
```

3.155.3 Rubi [A] (verified)

Time = 0.98 (sec) , antiderivative size = 209, normalized size of antiderivative = 1.04, number of steps used = 15, number of rules used = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.609, Rules used = {2789, 2756, 73, 221, 2790, 27, 7267, 25, 6546, 27, 6470, 27, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx$$

$$\Big\downarrow \text{ 2789}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{(d+ex)^{3/2}}dx}{d}$$

$$\Big\downarrow \text{ 2756}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx}{d}-\frac{e\left(\frac{2bn\int \frac{1}{x\sqrt{d+ex}}dx}{e}-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}\right)}{d}$$

$$\Big\downarrow \text{ 73}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx}{d}-\frac{e\left(\frac{4bn\int \frac{1}{\frac{d+ex}{e}-\frac{d}{e}}d\sqrt{d+ex}}{e^2}-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}\right)}{d}$$

$$\Big\downarrow \; 221$$

$$\frac{\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex}}dx}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 2790$$

$$\frac{-bn\int -\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}x}dx-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 27$$

$$\frac{\frac{2bn\int \frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 7267$$

$$\frac{\frac{4bn\int \frac{\sqrt{d+ex}\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 25$$

$$\frac{-\frac{4bn\int -\frac{\sqrt{d+ex}\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \; 6546$$

3.155. $\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx$

$$\frac{\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\frac{\int \frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$\Big\downarrow$ 27

$$\frac{\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\int \frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{d+ex}}d\sqrt{d+ex}\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$\Big\downarrow$ 6470

$$\frac{\frac{4bn\left(\frac{\int -\frac{d\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}}{\sqrt{d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$\Big\downarrow$ 27

$$\frac{\frac{4bn\left(\sqrt{d}\int -\frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{ex}d\sqrt{d+ex}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$\Big\downarrow$ 2849

3.155. $\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx$

$$\frac{\frac{4bn\left(-\sqrt{d}\int \frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}}d\frac{1}{\sqrt{d}-\sqrt{d+ex}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(c}{\sqrt{d}}}{d}$$

$$\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

$$\Big\downarrow \text{2752}$$

$$\frac{\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)\right)}{\sqrt{d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}}{d}-$$

$$\frac{e\left(-\frac{2(a+b\log(cx^n))}{e\sqrt{d+ex}}-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}e}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x)^(3/2)),x]
```

output
```
-((e*((-4*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/(Sqrt[d]*e) - (2*(a + b*Log[
c*x^n]))/(e*Sqrt[d + e*x])))/d) + ((-2*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a +
 b*Log[c*x^n]))/Sqrt[d] + (4*b*n*(ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2/2 - Arc
Tanh[Sqrt[d + e*x]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])] - P
olyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])]/2))/Sqrt[d])/d
```

3.155.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

3.155. $\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx$

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

rule 2789
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_))/
(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/x
), x], x] - Simp[e/d   Int[(d + e*x)^q*(a + b*Log[c*x^n])^p, x], x] /; Free
Q[{a, b, c, d, e, n}, x] && IGtQ[p, 0] && LtQ[q, -1] && IntegerQ[2*q]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

3.155. $\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx$

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

3.155.4 Maple [F]

$$\int \frac{a+b\ln \left(c\,x^{n}\right)}{x\left(e x +d \right)^{\frac{3}{2}}}d x$$

input
```
int((a+b*ln(c*x^n))/x/(e*x+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(e*x+d)^(3/2),x)
```

3.155.5 Fricas [F]

$$\int \frac{a+b\log \left(cx^n\right)}{x(d+ex)^{3/2}}\,dx=\int \frac{b\log \left(cx^{n}\right)+a}{\left(ex+d\right)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^(3/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/(e^2*x^3 + 2*d*e*x
^2 + d^2*x), x)
```

3.155.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx = \int \frac{a+b\log(cx^n)}{x(d+ex)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*(d + e*x)**(3/2)), x)
```

3.155.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^(3/2),x, algorithm="maxima")
```

output
```
a*(log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/d^(3/2) + 2/(s
qrt(e*x + d)*d)) + b*integrate((log(c) + log(x^n))/((e*x^2 + d*x)*sqrt(e*x
 + d)), x)
```

3.155.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^(3/2)*x), x)
```

3.155.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex)^{3/2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^(3/2)), x)
```

3.156 $\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx$

3.156.1 Optimal result

Integrand size = 23, antiderivative size = 253

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx = -\frac{bn\sqrt{d+ex}}{d^2x} - \frac{5ben\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}} - \frac{3ben\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2}{d^{5/2}} - \frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}} - \frac{a+b\log(cx^n)}{dx\sqrt{d+ex}} + \frac{3e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}} + \frac{6ben\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{5/2}} + \frac{3ben\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)}{d^{5/2}}$$

output
```
-5*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))/d^(5/2)-3*b*e*n*arctanh((e*x+d)^(1
/2)/d^(1/2))^2/d^(5/2)+3*e*arctanh((e*x+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/
d^(5/2)+6*b*e*n*arctanh((e*x+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x+
d)^(1/2)))/d^(5/2)+3*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x+d)^(1/2)))/
d^(5/2)-3*e*(a+b*ln(c*x^n))/d^2/(e*x+d)^(1/2)+(-a-b*ln(c*x^n))/d/x/(e*x+d)
^(1/2)-b*n*(e*x+d)^(1/2)/d^2/x
```

3.156.2 Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 506, normalized size of antiderivative = 2.00

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx = 2e\left(-\frac{2bn\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}} + \frac{bn\left(\frac{1}{\sqrt{d}-\sqrt{d+ex}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}\right)}{4d^2} - \frac{bn\left(\frac{1}{\sqrt{d}+\sqrt{d+ex}}+\frac{\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{\sqrt{d}}\right)}{4d^2} - \frac{a+b\log(cx^n)}{d^2\sqrt{d+ex}} + \frac{a+b\log(cx^n)}{4d^2\left(\sqrt{d}-\sqrt{d+ex}\right)} - \frac{a+b\log(cx^n)}{4d^2\left(\sqrt{d}+\sqrt{d+ex}\right)} - \frac{3(a+b\log(cx^n))\log\left(\sqrt{d}-\sqrt{d+ex}\right)}{4d^{5/2}} + \frac{3(a+b\log(cx^n))\log\left(\sqrt{d}+\sqrt{d+ex}\right)}{4d^{5/2}} + \frac{3bn\left(\log^2\left(\sqrt{d}-\sqrt{d+ex}\right)+2\log\left(\sqrt{d}-\sqrt{d+ex}\right)\log\left(\frac{\sqrt{d}+\sqrt{d+ex}}{2\sqrt{d}}\right)+2\,\text{PolyLog}\left(2,\frac{\sqrt{d}-\sqrt{d+ex}}{2\sqrt{d}}\right)\right)}{8d^{5/2}} - \frac{3bn\left(2\log\left(\frac{\sqrt{d}-\sqrt{d+ex}}{2\sqrt{d}}\right)\log\left(\sqrt{d}+\sqrt{d+ex}\right)+\log^2\left(\sqrt{d}+\sqrt{d+ex}\right)+2\,\text{PolyLog}\left(2,\frac{\sqrt{d}+\sqrt{d+ex}}{2\sqrt{d}}\right)\right)}{8d^{5/2}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x)^(3/2)),x]
```

output
```
2*e*((-2*b*n*ArcTanh[Sqrt[d + e*x]/Sqrt[d]])/d^(5/2) + (b*n*((Sqrt[d] - Sq
rt[d + e*x])^(-1) - ArcTanh[Sqrt[d + e*x]/Sqrt[d]]/Sqrt[d]))/(4*d^2) - (b*
n*((Sqrt[d] + Sqrt[d + e*x])^(-1) + ArcTanh[Sqrt[d + e*x]/Sqrt[d]]/Sqrt[d]
))/(4*d^2) - (a + b*Log[c*x^n])/(d^2*Sqrt[d + e*x]) + (a + b*Log[c*x^n])/(
4*d^2*(Sqrt[d] - Sqrt[d + e*x])) - (a + b*Log[c*x^n])/(4*d^2*(Sqrt[d] + Sq
rt[d + e*x])) - (3*(a + b*Log[c*x^n])*Log[Sqrt[d] - Sqrt[d + e*x]])/(4*d^(
5/2)) + (3*(a + b*Log[c*x^n])*Log[Sqrt[d] + Sqrt[d + e*x]])/(4*d^(5/2)) +
(3*b*n*(Log[Sqrt[d] - Sqrt[d + e*x]]^2 + 2*Log[Sqrt[d] - Sqrt[d + e*x]]*Lo
g[(Sqrt[d] + Sqrt[d + e*x])/(2*Sqrt[d])] + 2*PolyLog[2, (Sqrt[d] - Sqrt[d
+ e*x])/(2*Sqrt[d])]))/(8*d^(5/2)) - (3*b*n*(2*Log[(Sqrt[d] - Sqrt[d + e*x
])/(2*Sqrt[d])]*Log[Sqrt[d] + Sqrt[d + e*x]] + Log[Sqrt[d] + Sqrt[d + e*x]
]^2 + 2*PolyLog[2, (Sqrt[d] + Sqrt[d + e*x])/(2*Sqrt[d])]))/(8*d^(5/2)))
```

3.156.3 Rubi [A] (verified)

Time = 0.71 (sec) , antiderivative size = 234, normalized size of antiderivative = 0.92, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.217, Rules used = {2792, 25, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx$$

$$\Big\downarrow \ 2792$$

$$-bn\int -\frac{\frac{\sqrt{d}(d+3ex)}{\sqrt{d+ex}}-3ex\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}x^2}dx+\frac{3e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}-\frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex}}$$

$$\Big\downarrow \ 25$$

$$bn\int \frac{\frac{\sqrt{d}(d+3ex)}{\sqrt{d+ex}}-3ex\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{d^{5/2}x^2}dx+\frac{3e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}-\frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex}}$$

$$\Big\downarrow \ 27$$

$$\frac{bn\int \frac{\frac{\sqrt{d}(d+3ex)}{\sqrt{d+ex}}-3ex\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)}{x^2}dx}{d^{5/2}}+\frac{3e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}-\frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex}}$$

$$\Big\downarrow \ 2010$$

$$\frac{bn\int \left(-\frac{2e^2}{\sqrt{d}\sqrt{d+ex}}-\frac{3\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)e}{x}+\frac{2\sqrt{d+ex}e}{\sqrt{d}x}+\frac{\sqrt{d}\sqrt{d+ex}}{x^2}\right)dx}{d^{5/2}}+\frac{3e\,\text{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}-\frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex}}$$

$$\Big\downarrow \ 2009$$

$$\frac{3e\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}}-\frac{3e(a+b\log(cx^n))}{d^2\sqrt{d+ex}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex}}+\frac{bn\left(-3e\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)^2-5e\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)+6e\operatorname{arctanh}\left(\frac{\sqrt{d+ex}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right)+3e\operatorname{PolyLog}\left(2,1-\frac{2}{\sqrt{d}-}\right.\right.}{d^{5/2}}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x)^(3/2)),x]
```

output
```
(-3*e*(a + b*Log[c*x^n]))/(d^2*Sqrt[d + e*x]) - (a + b*Log[c*x^n])/(d*x*Sq
rt[d + e*x]) + (3*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]*(a + b*Log[c*x^n]))/d^(
5/2) + (b*n*(-((Sqrt[d]*Sqrt[d + e*x])/x) - 5*e*ArcTanh[Sqrt[d + e*x]/Sqrt
[d]] - 3*e*ArcTanh[Sqrt[d + e*x]/Sqrt[d]]^2 + 6*e*ArcTanh[Sqrt[d + e*x]/Sq
rt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])] + 3*e*PolyLog[2, 1 - (2*
Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x])]))/d^(5/2)
```

3.156.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.156.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{2} \left(e x +d \right)^{\frac{3}{2}}}d x$$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(e*x+d)^(3/2),x)
```

3.156.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx = \int \frac{b\log\left(cx^{n}\right) + a}{{\left(ex + d\right)}^{\frac{3}{2}} x^{2}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(3/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*a)/(e^2*x^4 + 2*d*e*x
^3 + d^2*x^2), x)
```

3.156.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx = \int \frac{a + b\log\left(cx^{n}\right)}{x^{2} \left(d + ex\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*(d + e*x)**(3/2)), x)
```

3.156.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^{\frac{3}{2}}x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(3/2),x, algorithm="maxima")
```

output
```
-1/2*a*(2*(3*(e*x + d)*e - 2*d*e)/((e*x + d)^(3/2)*d^2 - sqrt(e*x + d)*d^3
) + 3*e*log((sqrt(e*x + d) - sqrt(d))/(sqrt(e*x + d) + sqrt(d)))/d^(5/2))
+ b*integrate((log(c) + log(x^n))/((e*x^3 + d*x^2)*sqrt(e*x + d)), x)
```

3.156.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex+d)^{\frac{3}{2}}x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x + d)^(3/2)*x^2), x)
```

3.156.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex)^{3/2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(d+e\,x)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^(3/2)), x)
```

3.157 $\int \frac{x^2}{(d+ex)(a+b\log(cx^n))}\,dx$

3.157.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{x^2}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\text{Int}\left(\frac{x^2}{(d+ex)\left(a+b\log\left(cx^n\right)\right)},x\right)$$

output
```
Unintegrable(x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

3.157.2 Mathematica [N/A]

Not integrable

Time = 1.76 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{x^2}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$

input
```
Integrate[x^2/((d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[x^2/((d + e*x)*(a + b*Log[c*x^n])), x]
```

3.157.3 Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2}{(d+ex)(a+b\log(cx^n))} \, dx$$

$$\Big\downarrow \; 2796$$

$$\int \frac{x^2}{(d+ex)(a+b\log(cx^n))}dx$$

input
```
Int[x^2/((d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

3.157.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.157.4 Maple [N/A]

Not integrable

Time = 0.00 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{x^2}{(ex+d)(a+b\ln(c\,x^n))}dx$$

input
```
int(x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

output
```
int(x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

3.157.5 Fricas [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

$$\int \frac{x^2}{(d+ex)\,(a+b\log\left(cx^n\right))}\,dx = \int \frac{x^2}{(ex+d)(b\log\left(cx^n\right)+a)}\,dx$$

input
```
integrate(x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(x^2/(a*e*x + a*d + (b*e*x + b*d)*log(c*x^n)), x)
```

3.157.6 Sympy [N/A]

Not integrable

Time = 0.79 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{x^2}{(d+ex)\,(a+b\log\left(cx^n\right))}\,dx = \int \frac{x^2}{(a+b\log\left(cx^n\right))\,(d+ex)}\,dx$$

input
```
integrate(x**2/(e*x+d)/(a+b*ln(c*x**n)),x)
```

output
```
Integral(x**2/((a + b*log(c*x**n))*(d + e*x)), x)
```

3.157.7 Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2}{(d+ex)\,(a+b\log\left(cx^n\right))}\,dx = \int \frac{x^2}{(ex+d)(b\log\left(cx^n\right)+a)}\,dx$$

input
```
integrate(x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(x^2/((e*x + d)*(b*log(c*x^n) + a)), x)
```

3.157.8 Giac [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2}{(d+ex)(a+b\log(cx^n))}\,dx = \int \frac{x^2}{(ex+d)(b\log(cx^n)+a)}\,dx$$

input
```
integrate(x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(x^2/((e*x + d)*(b*log(c*x^n) + a)), x)
```

3.157.9 Mupad [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2}{(d+ex)(a+b\log(cx^n))}\,dx = \int \frac{x^2}{(a+b\,\ln(c\,x^n))\,(d+e\,x)}\,dx$$

input
```
int(x^2/((a + b*log(c*x^n))*(d + e*x)),x)
```

output
```
int(x^2/((a + b*log(c*x^n))*(d + e*x)), x)
```

3.158 $\int \frac{x}{(d+ex)(a+b\log(cx^n))}\,dx$

3.158.1 Optimal result

Integrand size = 21, antiderivative size = 21

$$\int \frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \text{Int}\left(\frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)},x\right)$$

output
```
Unintegrable(x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

3.158.2 Mathematica [N/A]

Not integrable

Time = 1.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \int \frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$

input
```
Integrate[x/((d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[x/((d + e*x)*(a + b*Log[c*x^n])), x]
```

3.158.3 Rubi [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}dx$$

input
```
Int[x/((d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

3.158.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.158.4 Maple [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{x}{(ex+d)\left(a+b\ln\left(c\,x^n\right)\right)}dx$$

input
```
int(x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

output
```
int(x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

3.158.5 Fricas [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.38

$$\int \frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{x}{(ex+d)(b\log\left(cx^n\right)+a)}\,dx$$

input
```
integrate(x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(x/(a*e*x + a*d + (b*e*x + b*d)*log(c*x^n)), x)
```

3.158.6 Sympy [N/A]

Not integrable

Time = 0.85 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.81

$$\int \frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{x}{\left(a+b\log\left(cx^n\right)\right)(d+ex)}\,dx$$

input
```
integrate(x/(e*x+d)/(a+b*ln(c*x**n)),x)
```

output
```
Integral(x/((a + b*log(c*x**n))*(d + e*x)), x)
```

3.158.7 Maxima [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{x}{(ex+d)(b\log\left(cx^n\right)+a)}\,dx$$

input
```
integrate(x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(x/((e*x + d)*(b*log(c*x^n) + a)), x)
```

3.158.8 Giac [N/A]

Not integrable

Time = 0.40 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x}{(d+ex)(a+b\log(cx^n))}\,dx=\int \frac{x}{(ex+d)(b\log(cx^n)+a)}\,dx$$

input
```
integrate(x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(x/((e*x + d)*(b*log(c*x^n) + a)), x)
```

3.158.9 Mupad [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x}{(d+ex)(a+b\log(cx^n))}\,dx=\int \frac{x}{(a+b\,\ln(c\,x^n))\,(d+e\,x)}\,dx$$

input
```
int(x/((a + b*log(c*x^n))*(d + e*x)),x)
```

output
```
int(x/((a + b*log(c*x^n))*(d + e*x)), x)
```

3.159 $\int \frac{1}{(d+ex)(a+b\log(cx^n))}\,dx$

3.159.1 Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{1}{(d+ex)(a+b\log(cx^n))}\,dx=\text{Int}\left(\frac{1}{(d+ex)(a+b\log(cx^n))},x\right)$$

output
```
Unintegrable(1/(e*x+d)/(a+b*ln(c*x^n)),x)
```

3.159.2 Mathematica [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex)(a+b\log(cx^n))}\,dx=\int \frac{1}{(d+ex)(a+b\log(cx^n))}\,dx$$

input
```
Integrate[1/((d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[1/((d + e*x)*(a + b*Log[c*x^n])), x]
```

3.159.3 Rubi [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex)(a+b\log(cx^n))}dx$$
$$\Big\downarrow \text{2768}$$
$$\int \frac{1}{(d+ex)(a+b\log(cx^n))}dx$$

input
```
Int[1/((d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

3.159.3.1 Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

3.159.4 Maple [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{1}{(ex+d)(a+b\ln(cx^n))}dx$$

input
```
int(1/(e*x+d)/(a+b*ln(c*x^n)),x)
```

output
```
int(1/(e*x+d)/(a+b*ln(c*x^n)),x)
```

3.159.5 Fricas [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.35

$$\int \frac{1}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)}\,dx$$

input
```
integrate(1/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(1/(a*e*x + a*d + (b*e*x + b*d)*log(c*x^n)), x)
```

3.159.6 Sympy [N/A]

Not integrable

Time = 0.99 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{1}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{\left(a+b\log\left(cx^n\right)\right)(d+ex)}\,dx$$

input
```
integrate(1/(e*x+d)/(a+b*ln(c*x**n)),x)
```

output
```
Integral(1/((a + b*log(c*x**n))*(d + e*x)), x)
```

3.159.7 Maxima [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)}\,dx$$

input
```
integrate(1/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x + d)*(b*log(c*x^n) + a)), x)
```

3.159.8 Giac [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)}\,dx$$

input
```
integrate(1/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(1/((e*x + d)*(b*log(c*x^n) + a)), x)
```

3.159.9 Mupad [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{1}{(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{\left(a+b\,\ln\left(c\,x^n\right)\right)\,\left(d+e\,x\right)}\,dx$$

input
```
int(1/((a + b*log(c*x^n))*(d + e*x)),x)
```

output
```
int(1/((a + b*log(c*x^n))*(d + e*x)), x)
```

3.160 $\int \frac{1}{x(d+ex)(a+b\log(cx^n))}\,dx$

3.160.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{1}{x(d+ex)\,(a+b\log\,(cx^n))}\,dx = \mathrm{Int}\left(\frac{1}{x(d+ex)\,(a+b\log\,(cx^n))},x\right)$$

output
```
Unintegrable(1/x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

3.160.2 Mathematica [N/A]

Not integrable

Time = 0.89 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x(d+ex)\,(a+b\log\,(cx^n))}\,dx = \int \frac{1}{x(d+ex)\,(a+b\log\,(cx^n))}\,dx$$

input
```
Integrate[1/(x*(d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[1/(x*(d + e*x)*(a + b*Log[c*x^n])), x]
```

3.160.3 Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{x(d+ex)(a+b\log(cx^n))}dx$$
$$\Big\downarrow \ 2796$$
$$\int \frac{1}{x(d+ex)(a+b\log(cx^n))}dx$$

input
```
Int[1/(x*(d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

3.160.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.160.4 Maple [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{1}{x(ex+d)(a+b\ln(cx^n))}dx$$

input
```
int(1/x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

output
```
int(1/x/(e*x+d)/(a+b*ln(c*x^n)),x)
```

3.160.5 Fricas [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.43

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)x}\,dx$$

input
```
integrate(1/x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(1/(a*e*x^2 + a*d*x + (b*e*x^2 + b*d*x)*log(c*x^n)), x)
```

3.160.6 Sympy [N/A]

Not integrable

Time = 1.44 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.83

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \int \frac{1}{x\left(a+b\log\left(cx^n\right)\right)(d+ex)}\,dx$$

input
```
integrate(1/x/(e*x+d)/(a+b*ln(c*x**n)),x)
```

output
```
Integral(1/(x*(a + b*log(c*x**n))*(d + e*x)), x)
```

3.160.7 Maxima [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)x}\,dx$$

input
```
integrate(1/x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x + d)*(b*log(c*x^n) + a)*x), x)
```

3.160.8 Giac [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)x}\,dx$$

input
```
integrate(1/x/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(1/((e*x + d)*(b*log(c*x^n) + a)*x), x)
```

3.160.9 Mupad [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{x\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,\left(d+e\,x\right)}\,dx$$

input
```
int(1/(x*(a + b*log(c*x^n))*(d + e*x)),x)
```

output
```
int(1/(x*(a + b*log(c*x^n))*(d + e*x)), x)
```

3.161 $\int \frac{1}{x^2(d+ex)(a+b\log(cx^n))}\,dx$

3.161.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \operatorname{Int}\left(\frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)},x\right)$$

output
```
Unintegrable(1/x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

3.161.2 Mathematica [N/A]

Not integrable

Time = 1.02 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx = \int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx$$

input
```
Integrate[1/(x^2*(d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[1/(x^2*(d + e*x)*(a + b*Log[c*x^n])), x]
```

3.161.3 Rubi [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}dx$$

$$\Big\downarrow \text{2796}$$

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}dx$$

input
```
Int[1/(x^2*(d + e*x)*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

3.161.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.161.4 Maple [N/A]

Not integrable

Time = 0.00 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{1}{x^2\left(ex+d\right)\left(a+b\ln\left(c\,x^n\right)\right)}dx$$

input
```
int(1/x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

output
```
int(1/x^2/(e*x+d)/(a+b*ln(c*x^n)),x)
```

3.161.5 Fricas [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.61

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)x^2}\,dx$$

input
```
integrate(1/x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(1/(a*e*x^3 + a*d*x^2 + (b*e*x^3 + b*d*x^2)*log(c*x^n)), x)
```

3.161.6 Sympy [N/A]

Not integrable

Time = 1.13 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{x^2\left(a+b\log\left(cx^n\right)\right)(d+ex)}\,dx$$

input
```
integrate(1/x**2/(e*x+d)/(a+b*ln(c*x**n)),x)
```

output
```
Integral(1/(x**2*(a + b*log(c*x**n))*(d + e*x)), x)
```

3.161.7 Maxima [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)x^2}\,dx$$

input
```
integrate(1/x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x + d)*(b*log(c*x^n) + a)*x^2), x)
```

3.161.8 Giac [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{(ex+d)(b\log\left(cx^n\right)+a)x^2}\,dx$$

input
```
integrate(1/x^2/(e*x+d)/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(1/((e*x + d)*(b*log(c*x^n) + a)*x^2), x)
```

3.161.9 Mupad [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{1}{x^2(d+ex)\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{x^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,\left(d+e\,x\right)}\,dx$$

input
```
int(1/(x^2*(a + b*log(c*x^n))*(d + e*x)),x)
```

output
```
int(1/(x^2*(a + b*log(c*x^n))*(d + e*x)), x)
```

3.162 $\int (fx)^m(d+ex)^3 (a+b\log(cx^n))\,dx$

3.162.1 Optimal result

Integrand size = 23, antiderivative size = 211

$$\int (fx)^m(d+ex)^3 (a+b\log(cx^n))\,dx = -\frac{bd^3n(fx)^{1+m}}{f(1+m)^2} - \frac{3bd^2en(fx)^{2+m}}{f^2(2+m)^2} - \frac{3bde^2n(fx)^{3+m}}{f^3(3+m)^2} - \frac{be^3n(fx)^{4+m}}{f^4(4+m)^2} + \frac{d^3(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} + \frac{3d^2e(fx)^{2+m}(a+b\log(cx^n))}{f^2(2+m)} + \frac{3de^2(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)} + \frac{e^3(fx)^{4+m}(a+b\log(cx^n))}{f^4(4+m)}$$

output
```
-b*d^3*n*(f*x)^(1+m)/f/(1+m)^2-3*b*d^2*e*n*(f*x)^(2+m)/f^2/(2+m)^2-3*b*d*e
^2*n*(f*x)^(3+m)/f^3/(3+m)^2-b*e^3*n*(f*x)^(4+m)/f^4/(4+m)^2+d^3*(f*x)^(1+
m)*(a+b*ln(c*x^n))/f/(1+m)+3*d^2*e*(f*x)^(2+m)*(a+b*ln(c*x^n))/f^2/(2+m)+3
*d*e^2*(f*x)^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)+e^3*(f*x)^(4+m)*(a+b*ln(c*x^n
))/f^4/(4+m)
```

3.162.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 152, normalized size of antiderivative = 0.72

$$\int (fx)^m(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = x(fx)^m\left(-\frac{bd^3n}{(1+m)^2}-\frac{3bd^2enx}{(2+m)^2}-\frac{3bde^2nx^2}{(3+m)^2}-\frac{be^3nx^3}{(4+m)^2}+\frac{d^3(a+b\log(cx^n))}{1+m}+\frac{3d^2ex(a+b\log(cx^n))}{2+m}+\frac{3de^2x^2(a+b\log(cx^n))}{3+m}+\frac{e^3x^3(a+b\log(cx^n))}{4+m}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d^3*n)/(1 + m)^2) - (3*b*d^2*e*n*x)/(2 + m)^2 - (3*b*d*e^2
*n*x^2)/(3 + m)^2 - (b*e^3*n*x^3)/(4 + m)^2 + (d^3*(a + b*Log[c*x^n]))/(1
+ m) + (3*d^2*e*x*(a + b*Log[c*x^n]))/(2 + m) + (3*d*e^2*x^2*(a + b*Log[c*
x^n]))/(3 + m) + (e^3*x^3*(a + b*Log[c*x^n]))/(4 + m))
```

3.162.3 Rubi [A] (verified)

Time = 0.53 (sec) , antiderivative size = 206, normalized size of antiderivative = 0.98, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2792, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^3(fx)^m\left(a+b\log\left(cx^n\right)\right)\,dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int (fx)^m\left(\frac{d^3}{m+1}+\frac{3exd^2}{m+2}+\frac{3e^2x^2d}{m+3}+\frac{e^3x^3}{m+4}\right)dx+\frac{d^3(fx)^{m+1}\left(a+b\log\left(cx^n\right)\right)}{f(m+1)}+\frac{3d^2e(fx)^{m+2}\left(a+b\log\left(cx^n\right)\right)}{f^2(m+2)}+\frac{3de^2(fx)^{m+3}\left(a+b\log\left(cx^n\right)\right)}{f^3(m+3)}+\frac{e^3(fx)^{m+4}\left(a+b\log\left(cx^n\right)\right)}{f^4(m+4)}$$

$$\Big\downarrow \text{ 2010}$$

$$-bn\int\left(\frac{d^3(fx)^m}{m+1}+\frac{3d^2e(fx)^{m+1}}{f(m+2)}+\frac{3de^2(fx)^{m+2}}{f^2(m+3)}+\frac{e^3(fx)^{m+3}}{f^3(m+4)}\right)dx+\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2e(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}+\frac{3de^2(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^3(fx)^{m+4}(a+b\log(cx^n))}{f^4(m+4)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2e(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}+\frac{3de^2(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^3(fx)^{m+4}(a+b\log(cx^n))}{f^4(m+4)}-bn\left(\frac{d^3(fx)^{m+1}}{f(m+1)^2}+\frac{3d^2e(fx)^{m+2}}{f^2(m+2)^2}+\frac{3de^2(fx)^{m+3}}{f^3(m+3)^2}+\frac{e^3(fx)^{m+4}}{f^4(m+4)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d^3*(f*x)^(1 + m))/(f*(1 + m)^2) + (3*d^2*e*(f*x)^(2 + m))/(f^2*(2
 + m)^2) + (3*d*e^2*(f*x)^(3 + m))/(f^3*(3 + m)^2) + (e^3*(f*x)^(4 + m))/(
f^4*(4 + m)^2))) + (d^3*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m)) + (3
*d^2*e*(f*x)^(2 + m)*(a + b*Log[c*x^n]))/(f^2*(2 + m)) + (3*d*e^2*(f*x)^(3
 + m)*(a + b*Log[c*x^n]))/(f^3*(3 + m)) + (e^3*(f*x)^(4 + m)*(a + b*Log[c*
x^n]))/(f^4*(4 + m))
```

3.162.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.162.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1745 vs. $2(211) = 422$.

Time = 2.22 (sec) , antiderivative size = 1746, normalized size of antiderivative = 8.27

method	result	size
parallelrisch	Expression too large to display	1746
risch	Expression too large to display	4955

input
```
int((f*x)^m*(e*x+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(984*x^2*(f*x)^m*b*d^2*e*m^3*n-2208*x^3*(f*x)^m*ln(c*x^n)*b*d*e^2*m+672*x
^3*(f*x)^m*b*d*e^2*m*n-4686*x^2*(f*x)^m*ln(c*x^n)*b*d^2*e*m^2+1659*x^2*(f*
x)^m*b*d^2*e*m^2*n-3168*x^2*(f*x)^m*ln(c*x^n)*b*d^2*e*m+1368*x^2*(f*x)^m*b
*d^2*e*m*n-3*x^3*(f*x)^m*ln(c*x^n)*b*d*e^2*m^7-51*x^3*(f*x)^m*ln(c*x^n)*b*
d*e^2*m^6+3*x^3*(f*x)^m*b*d*e^2*m^6*n-3*x^2*(f*x)^m*ln(c*x^n)*b*d^2*e*m^7-
357*x^3*(f*x)^m*ln(c*x^n)*b*d*e^2*m^5+42*x^3*(f*x)^m*b*d*e^2*m^5*n-54*x^2*
(f*x)^m*ln(c*x^n)*b*d^2*e*m^6+3*x^2*(f*x)^m*b*d^2*e*m^6*n-1329*x^3*(f*x)^m
*ln(c*x^n)*b*d*e^2*m^4+231*x^3*(f*x)^m*b*d*e^2*m^4*n-402*x^2*(f*x)^m*ln(c*
x^n)*b*d^2*e*m^5+48*x^2*(f*x)^m*b*d^2*e*m^5*n-2832*x^3*(f*x)^m*ln(c*x^n)*b
*d*e^2*m^3+636*x^3*(f*x)^m*b*d*e^2*m^3*n-1596*x^2*(f*x)^m*ln(c*x^n)*b*d^2*
e*m^4+306*x^2*(f*x)^m*b*d^2*e*m^4*n-144*x^4*(f*x)^m*a*e^3-576*x*(f*x)^m*a*
d^3-3444*x^3*(f*x)^m*ln(c*x^n)*b*d*e^2*m^2+924*x^3*(f*x)^m*b*d*e^2*m^2*n-3
627*x^2*(f*x)^m*ln(c*x^n)*b*d^2*e*m^3+576*x*(f*x)^m*b*d^3*n-576*b*d^3*ln(c
*x^n)*(f*x)^m*x-144*e^3*b*ln(c*x^n)*(f*x)^m*x^4-3627*x^2*(f*x)^m*a*d^2*e*m
^3-1624*x*(f*x)^m*ln(c*x^n)*b*d^3*m^3+516*x*(f*x)^m*b*d^3*m^3*n-2208*x^3*(
f*x)^m*a*d*e^2*m+192*x^3*(f*x)^m*b*d*e^2*n-4686*x^2*(f*x)^m*a*d^2*e*m^2-23
56*x*(f*x)^m*ln(c*x^n)*b*d^3*m^2+1108*x*(f*x)^m*b*d^3*m^2*n-864*e*d^2*b*ln
(c*x^n)*(f*x)^m*x^2-576*e^2*d*b*ln(c*x^n)*(f*x)^m*x^3-x^4*(f*x)^m*a*e^3*m^
7-16*x^4*(f*x)^m*a*e^3*m^6-106*x^4*(f*x)^m*a*e^3*m^5-376*x^4*(f*x)^m*a*e^3
*m^4-x*(f*x)^m*a*d^3*m^7-769*x^4*(f*x)^m*a*e^3*m^3-19*x*(f*x)^m*a*d^3*m...
```

3.162.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1222 vs. $2(211) = 422$.

Time = 0.32 (sec) , antiderivative size = 1222, normalized size of antiderivative = 5.79

$$\int (fx)^m (d+ex)^3 (a+b\log(cx^n))\, dx = \text{Too large to display}$$

input
```
integrate((f*x)^m*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((a*e^3*m^7 + 16*a*e^3*m^6 + 106*a*e^3*m^5 + 376*a*e^3*m^4 + 769*a*e^3*m^3
 + 904*a*e^3*m^2 + 564*a*e^3*m + 144*a*e^3 - (b*e^3*m^6 + 12*b*e^3*m^5 + 5
8*b*e^3*m^4 + 144*b*e^3*m^3 + 193*b*e^3*m^2 + 132*b*e^3*m + 36*b*e^3)*n)*x
^4 + 3*(a*d*e^2*m^7 + 17*a*d*e^2*m^6 + 119*a*d*e^2*m^5 + 443*a*d*e^2*m^4 +
 944*a*d*e^2*m^3 + 1148*a*d*e^2*m^2 + 736*a*d*e^2*m + 192*a*d*e^2 - (b*d*e
^2*m^6 + 14*b*d*e^2*m^5 + 77*b*d*e^2*m^4 + 212*b*d*e^2*m^3 + 308*b*d*e^2*m
^2 + 224*b*d*e^2*m + 64*b*d*e^2)*n)*x^3 + 3*(a*d^2*e*m^7 + 18*a*d^2*e*m^6
+ 134*a*d^2*e*m^5 + 532*a*d^2*e*m^4 + 1209*a*d^2*e*m^3 + 1562*a*d^2*e*m^2
+ 1056*a*d^2*e*m + 288*a*d^2*e - (b*d^2*e*m^6 + 16*b*d^2*e*m^5 + 102*b*d^2
*e*m^4 + 328*b*d^2*e*m^3 + 553*b*d^2*e*m^2 + 456*b*d^2*e*m + 144*b*d^2*e)*
n)*x^2 + (a*d^3*m^7 + 19*a*d^3*m^6 + 151*a*d^3*m^5 + 649*a*d^3*m^4 + 1624*
a*d^3*m^3 + 2356*a*d^3*m^2 + 1824*a*d^3*m + 576*a*d^3 - (b*d^3*m^6 + 18*b*
d^3*m^5 + 133*b*d^3*m^4 + 516*b*d^3*m^3 + 1108*b*d^3*m^2 + 1248*b*d^3*m +
576*b*d^3)*n)*x + ((b*e^3*m^7 + 16*b*e^3*m^6 + 106*b*e^3*m^5 + 376*b*e^3*m
^4 + 769*b*e^3*m^3 + 904*b*e^3*m^2 + 564*b*e^3*m + 144*b*e^3)*x^4 + 3*(b*d
*e^2*m^7 + 17*b*d*e^2*m^6 + 119*b*d*e^2*m^5 + 443*b*d*e^2*m^4 + 944*b*d*e^
2*m^3 + 1148*b*d*e^2*m^2 + 736*b*d*e^2*m + 192*b*d*e^2)*x^3 + 3*(b*d^2*e*m
^7 + 18*b*d^2*e*m^6 + 134*b*d^2*e*m^5 + 532*b*d^2*e*m^4 + 1209*b*d^2*e*m^3
 + 1562*b*d^2*e*m^2 + 1056*b*d^2*e*m + 288*b*d^2*e)*x^2 + (b*d^3*m^7 + 19*
b*d^3*m^6 + 151*b*d^3*m^5 + 649*b*d^3*m^4 + 1624*b*d^3*m^3 + 2356*b*d^3...
```

3.162.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 6156 vs. $2(206) = 412$.

Time = 4.99 (sec) , antiderivative size = 6156, normalized size of antiderivative = 29.18

$$\int (fx)^m (d+ex)^3 (a+b\log(cx^n))\, dx = \text{Too large to display}$$

input
```
integrate((f*x)**m*(e*x+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise(((-a*d**3/(3*x**3) - 3*a*d**2*e/(2*x**2) - 3*a*d*e**2/x + a*e**3
*log(x) + b*d**3*(-n/(9*x**3) - log(c*x**n)/(3*x**3)) + 3*b*d**2*e*(-n/(4*
x**2) - log(c*x**n)/(2*x**2)) + 3*b*d*e**2*(-n/x - log(c*x**n)/x) - b*e**3
*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)))/f**
4, Eq(m, -4)), ((-a*d**3/(2*x**2) - 3*a*d**2*e/x + 3*a*d*e**2*log(c*x**n)/
n + a*e**3*x - b*d**3*n/(4*x**2) - b*d**3*log(c*x**n)/(2*x**2) - 3*b*d**2*
e*n/x - 3*b*d**2*e*log(c*x**n)/x + 3*b*d*e**2*log(c*x**n)**2/(2*n) - b*e**
3*n*x + b*e**3*x*log(c*x**n))/f**3, Eq(m, -3)), ((-a*d**3/x + 3*a*d**2*e*l
og(c*x**n)/n + 3*a*d*e**2*x + a*e**3*x**2/2 - b*d**3*n/x - b*d**3*log(c*x*
*n)/x + 3*b*d**2*e*log(c*x**n)**2/(2*n) - 3*b*d*e**2*n*x + 3*b*d*e**2*x*lo
g(c*x**n) - b*e**3*n*x**2/4 + b*e**3*x**2*log(c*x**n)/2)/f**2, Eq(m, -2)),
 ((a*d**3*log(c*x**n)/n + 3*a*d**2*e*x + 3*a*d*e**2*x**2/2 + a*e**3*x**3/3
 + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*e*n*x + 3*b*d**2*e*x*log(c*x**n)
 - 3*b*d*e**2*n*x**2/4 + 3*b*d*e**2*x**2*log(c*x**n)/2 - b*e**3*n*x**3/9 +
 b*e**3*x**3*log(c*x**n)/3)/f, Eq(m, -1)), (a*d**3*m**7*x*(f*x)**m/(m**8 +
 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*
m + 576) + 19*a*d**3*m**6*x*(f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5
 + 2273*m**4 + 3980*m**3 + 4180*m**2 + 2400*m + 576) + 151*a*d**3*m**5*x*(
f*x)**m/(m**8 + 20*m**7 + 170*m**6 + 800*m**5 + 2273*m**4 + 3980*m**3 + 41
80*m**2 + 2400*m + 576) + 649*a*d**3*m**4*x*(f*x)**m/(m**8 + 20*m**7 + ...
```

3.162.7 Maxima [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 271, normalized size of antiderivative = 1.28

$$\int (fx)^m(d+ex)^3\,(a+b\log(cx^n))\,dx = \frac{be^3f^mx^4x^m\log(cx^n)}{m+4} + \frac{ae^3f^mx^4x^m}{m+4} - \frac{be^3f^mnx^4x^m}{(m+4)^2} + \frac{3\,bde^2f^mx^3x^m\log(cx^n)}{m+3} + \frac{3\,ade^2f^mx^3x^m}{m+3} - \frac{3\,bde^2f^mnx^3x^m}{(m+3)^2} + \frac{3\,bd^2ef^mx^2x^m\log(cx^n)}{m+2} + \frac{3\,ad^2ef^mx^2x^m}{m+2} - \frac{3\,bd^2ef^mnx^2x^m}{(m+2)^2} - \frac{bd^3f^mnxx^m}{(m+1)^2} + \frac{(fx)^{m+1}\,bd^3\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}\,ad^3}{f(m+1)}$$

input
```
integrate((f*x)^m*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e^3*f^m*x^4*x^m*log(c*x^n)/(m + 4) + a*e^3*f^m*x^4*x^m/(m + 4) - b*e^3*f
^m*n*x^4*x^m/(m + 4)^2 + 3*b*d*e^2*f^m*x^3*x^m*log(c*x^n)/(m + 3) + 3*a*d*
e^2*f^m*x^3*x^m/(m + 3) - 3*b*d*e^2*f^m*n*x^3*x^m/(m + 3)^2 + 3*b*d^2*e*f^
m*x^2*x^m*log(c*x^n)/(m + 2) + 3*a*d^2*e*f^m*x^2*x^m/(m + 2) - 3*b*d^2*e*f
^m*n*x^2*x^m/(m + 2)^2 - b*d^3*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*d^3
*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d^3/(f*(m + 1))
```

3.162.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 536 vs. $2(211) = 422$.

Time = 0.33 (sec) , antiderivative size = 536, normalized size of antiderivative = 2.54

$$\int (fx)^m(d+ex)^3\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{be^3f^3f^mx^4x^m\log(c)}{f^3m+4f^3} + \frac{ae^3f^3f^mx^4x^m}{f^3m+4f^3} + \frac{be^3f^mmnx^4x^m\log(x)}{m^2+8m+16} + \frac{3bde^2f^2f^mx^3x^m\log(c)}{f^2m+3f^2} + \frac{3bde^2f^mmnx^3x^m\log(x)}{m^2+6m+9} + \frac{4be^3f^mnx^4x^m\log(x)}{m^2+8m+16} + \frac{3ade^2f^2f^mx^3x^m}{f^2m+3f^2} - \frac{be^3f^mnx^4x^m}{m^2+8m+16} + \frac{3bd^2ef^mmnx^2x^m\log(x)}{m^2+4m+4} + \frac{9bde^2f^mnx^3x^m\log(x)}{m^2+6m+9} - \frac{3bde^2f^mnx^3x^m}{m^2+6m+9} + \frac{bd^3f^mmnxx^m\log(x)}{m^2+2m+1} + \frac{6bd^2ef^mnx^2x^m\log(x)}{m^2+4m+4} - \frac{3bd^2ef^mnx^2x^m}{m^2+4m+4} + \frac{3bd^2ef^mx^2x^m\log(c)}{m+2} + \frac{bd^3f^mnxx^m\log(x)}{m^2+2m+1} - \frac{bd^3f^mnxx^m}{m^2+2m+1} + \frac{3ad^2ef^mx^2x^m}{m+2} + \frac{(fx)^m bd^3x\log(c)}{m+1} + \frac{(fx)^m ad^3x}{m+1}$$

input
```
integrate((f*x)^m*(e*x+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e^3*f^3*f^m*x^4*x^m*log(c)/(f^3*m + 4*f^3) + a*e^3*f^3*f^m*x^4*x^m/(f^3*
m + 4*f^3) + b*e^3*f^m*m*n*x^4*x^m*log(x)/(m^2 + 8*m + 16) + 3*b*d*e^2*f^2
*f^m*x^3*x^m*log(c)/(f^2*m + 3*f^2) + 3*b*d*e^2*f^m*m*n*x^3*x^m*log(x)/(m^
2 + 6*m + 9) + 4*b*e^3*f^m*n*x^4*x^m*log(x)/(m^2 + 8*m + 16) + 3*a*d*e^2*f
^2*f^m*x^3*x^m/(f^2*m + 3*f^2) - b*e^3*f^m*n*x^4*x^m/(m^2 + 8*m + 16) + 3*
b*d^2*e*f^m*m*n*x^2*x^m*log(x)/(m^2 + 4*m + 4) + 9*b*d*e^2*f^m*n*x^3*x^m*l
og(x)/(m^2 + 6*m + 9) - 3*b*d*e^2*f^m*n*x^3*x^m/(m^2 + 6*m + 9) + b*d^3*f^
m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + 6*b*d^2*e*f^m*n*x^2*x^m*log(x)/(m^2 +
 4*m + 4) - 3*b*d^2*e*f^m*n*x^2*x^m/(m^2 + 4*m + 4) + 3*b*d^2*e*f^m*x^2*x^
m*log(c)/(m + 2) + b*d^3*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - b*d^3*f^m*n*
x*x^m/(m^2 + 2*m + 1) + 3*a*d^2*e*f^m*x^2*x^m/(m + 2) + (f*x)^m*b*d^3*x*lo
g(c)/(m + 1) + (f*x)^m*a*d^3*x/(m + 1)
```

3.162.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d+ex)^3 (a+b\log(cx^n))\, dx = \int (f\,x)^m\,(a+b\,\ln(c\,x^n))\,(d+e\,x)^3\,dx$$

input
```
int((f*x)^m*(a + b*log(c*x^n))*(d + e*x)^3,x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n))*(d + e*x)^3, x)
```

3.163 $\int (fx)^m(d+ex)^2 (a+b\log (cx^n)) \, dx$

3.163.1 Optimal result

Integrand size = 23, antiderivative size = 153

$$\int (fx)^m(d+ex)^2 (a+b\log (cx^n)) \, dx = -\frac{bd^2n(fx)^{1+m}}{f(1+m)^2}-\frac{2bden(fx)^{2+m}}{f^2(2+m)^2}-\frac{be^2n(fx)^{3+m}}{f^3(3+m)^2}+\frac{d^2(fx)^{1+m} (a+b\log (cx^n))}{f(1+m)}+\frac{2de(fx)^{2+m} (a+b\log (cx^n))}{f^2(2+m)}+\frac{e^2(fx)^{3+m} (a+b\log (cx^n))}{f^3(3+m)}$$

output
```
-b*d^2*n*(f*x)^(1+m)/f/(1+m)^2-2*b*d*e*n*(f*x)^(2+m)/f^2/(2+m)^2-b*e^2*n*(
f*x)^(3+m)/f^3/(3+m)^2+d^2*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)+2*d*e*(f*x)
^(2+m)*(a+b*ln(c*x^n))/f^2/(2+m)+e^2*(f*x)^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)
```

3.163.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 108, normalized size of antiderivative = 0.71

$$\int (fx)^m(d+ex)^2 (a+b\log (cx^n)) \, dx = x(fx)^m \left(-\frac{bd^2n}{(1+m)^2}-\frac{2bdenx}{(2+m)^2}-\frac{be^2nx^2}{(3+m)^2}+\frac{d^2(a+b\log (cx^n))}{1+m}+\frac{2dex(a+b\log (cx^n))}{2+m}+\frac{e^2x^2(a+b\log (cx^n))}{3+m}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d^2*n)/(1 + m)^2) - (2*b*d*e*n*x)/(2 + m)^2 - (b*e^2*n*x^2
)/(3 + m)^2 + (d^2*(a + b*Log[c*x^n]))/(1 + m) + (2*d*e*x*(a + b*Log[c*x^n
]))/(2 + m) + (e^2*x^2*(a + b*Log[c*x^n]))/(3 + m))
```

3.163.3 Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 183, normalized size of antiderivative = 1.20, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2792, 27, 1140, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)^2(fx)^m (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{(fx)^m \left((m+2)(m+3)d^2+2e(m+1)(m+3)xd+e^2(m+1)(m+2)x^2\right)}{m^3+6m^2+11m+6}dx+\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2de(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}+\frac{e^2(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int (fx)^m \left((m+2)(m+3)d^2+2e(m+1)(m+3)xd+e^2(m+1)(m+2)x^2\right)dx}{m^3+6m^2+11m+6}+\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2de(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}+\frac{e^2(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}$$

$$\Big\downarrow \text{1140}$$

$$-\frac{bn\int \left(d^2(m+2)(m+3)(fx)^m+\frac{2de(m+1)(m+3)(fx)^{m+1}}{f}+\frac{e^2(m+1)(m+2)(fx)^{m+2}}{f^2}\right)dx}{m^3+6m^2+11m+6}+\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2de(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}+\frac{e^2(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2de(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}+\frac{e^2(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}-\frac{bn\left(\frac{d^2(m+2)(m+3)(fx)^{m+1}}{f(m+1)}+\frac{2de(m+1)(m+3)(fx)^{m+2}}{f^2(m+2)}+\frac{e^2(m+1)(m+2)(fx)^{m+3}}{f^3(m+3)}\right)}{m^3+6m^2+11m+6}$$

input
```
Int[(f*x)^m*(d + e*x)^2*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*((d^2*(2 + m)*(3 + m)*(f*x)^(1 + m))/(f*(1 + m)) + (2*d*e*(1 + m)*(
3 + m)*(f*x)^(2 + m))/(f^2*(2 + m)) + (e^2*(1 + m)*(2 + m)*(f*x)^(3 + m))/
(f^3*(3 + m))))/(6 + 11*m + 6*m^2 + m^3)) + (d^2*(f*x)^(1 + m)*(a + b*Log[
c*x^n]))/(f*(1 + m)) + (2*d*e*(f*x)^(2 + m)*(a + b*Log[c*x^n]))/(f^2*(2 +
m)) + (e^2*(f*x)^(3 + m)*(a + b*Log[c*x^n]))/(f^3*(3 + m))
```

3.163.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1140
```
Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x
_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /;
FreeQ[{a, b, c, d, e, m}, x] && IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.163.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 910 vs. $2(153) = 306$.

Time = 1.05 (sec) , antiderivative size = 911, normalized size of antiderivative = 5.95

method	result
parallelrisch	$-\frac{-12x^3(fx)^m a\,e^2-36x(fx)^m a\,d^2-36x(fx)^m \ln(c\,x^n)b\,d^2-12x^3(fx)^m \ln(c\,x^n)b\,e^2-x^3(fx)^m a\,e^2m^5-9x^3(fx)^m a\,e^2m^4-31}{}$
risch	Expression too large to display

input
```
int((f*x)^m*(e*x+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-12*x^3*(f*x)^m*a*e^2-36*x*(f*x)^m*a*d^2-36*x*(f*x)^m*ln(c*x^n)*b*d^2-12
*x^3*(f*x)^m*ln(c*x^n)*b*e^2-x^3*(f*x)^m*a*e^2*m^5-9*x^3*(f*x)^m*a*e^2*m^4
-31*x^3*(f*x)^m*a*e^2*m^3-x*(f*x)^m*a*d^2*m^5-51*x^3*(f*x)^m*a*e^2*m^2-11*
x*(f*x)^m*a*d^2*m^4-40*x^3*(f*x)^m*a*e^2*m+4*x^3*(f*x)^m*b*e^2*n-47*x*(f*x
)^m*a*d^2*m^3-97*x*(f*x)^m*a*d^2*m^2-36*x^2*(f*x)^m*a*d*e-96*x*(f*x)^m*a*d
^2*m+36*x*(f*x)^m*b*d^2*n-x^3*(f*x)^m*ln(c*x^n)*b*e^2*m^5-36*x^2*(f*x)^m*l
n(c*x^n)*b*d*e-9*x^3*(f*x)^m*ln(c*x^n)*b*e^2*m^4+x^3*(f*x)^m*b*e^2*m^4*n-3
1*x^3*(f*x)^m*ln(c*x^n)*b*e^2*m^3+6*x^3*(f*x)^m*b*e^2*m^3*n-2*x^2*(f*x)^m*
a*d*e*m^5-x*(f*x)^m*ln(c*x^n)*b*d^2*m^5-51*x^3*(f*x)^m*ln(c*x^n)*b*e^2*m^2
+13*x^3*(f*x)^m*b*e^2*m^2*n-20*x^2*(f*x)^m*a*d*e*m^4-11*x*(f*x)^m*ln(c*x^n
)*b*d^2*m^4+x*(f*x)^m*b*d^2*m^4*n-40*x^3*(f*x)^m*ln(c*x^n)*b*e^2*m+12*x^3*
(f*x)^m*b*e^2*m*n-76*x^2*(f*x)^m*a*d*e*m^3-47*x*(f*x)^m*ln(c*x^n)*b*d^2*m^
3+10*x*(f*x)^m*b*d^2*m^3*n-136*x^2*(f*x)^m*a*d*e*m^2-97*x*(f*x)^m*ln(c*x^n
)*b*d^2*m^2+37*x*(f*x)^m*b*d^2*m^2*n-114*x^2*(f*x)^m*a*d*e*m+18*x^2*(f*x)^
m*b*d*e*n-96*x*(f*x)^m*ln(c*x^n)*b*d^2*m+60*x*(f*x)^m*b*d^2*m*n-2*x^2*(f*x
)^m*ln(c*x^n)*b*d*e*m^5-20*x^2*(f*x)^m*ln(c*x^n)*b*d*e*m^4+2*x^2*(f*x)^m*b
*d*e*m^4*n-76*x^2*(f*x)^m*ln(c*x^n)*b*d*e*m^3+16*x^2*(f*x)^m*b*d*e*m^3*n-1
36*x^2*(f*x)^m*ln(c*x^n)*b*d*e*m^2+44*x^2*(f*x)^m*b*d*e*m^2*n-114*x^2*(f*x
)^m*ln(c*x^n)*b*d*e*m+48*x^2*(f*x)^m*b*d*e*m*n)/(3+m)^2/(1+m)^2/(2+m)^2
```

3.163.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 633 vs. $2(153) = 306$.

Time = 0.32 (sec) , antiderivative size = 633, normalized size of antiderivative = 4.14

$$\int (fx)^m(d+ex)^2\,(a+b\log{(cx^n)})\;dx$$
$$= \frac{((ae^2m^5 + 9\,ae^2m^4 + 31\,ae^2m^3 + 51\,ae^2m^2 + 40\,ae^2m + 12\,ae^2 - (be^2m^4 + 6\,be^2m^3 + 13\,be^2m^2 + 12\,be^2n}{}$$

input
```
integrate((f*x)^m*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((a*e^2*m^5 + 9*a*e^2*m^4 + 31*a*e^2*m^3 + 51*a*e^2*m^2 + 40*a*e^2*m + 12*
a*e^2 - (b*e^2*m^4 + 6*b*e^2*m^3 + 13*b*e^2*m^2 + 12*b*e^2*m + 4*b*e^2)*n)
*x^3 + 2*(a*d*e*m^5 + 10*a*d*e*m^4 + 38*a*d*e*m^3 + 68*a*d*e*m^2 + 57*a*d*
e*m + 18*a*d*e - (b*d*e*m^4 + 8*b*d*e*m^3 + 22*b*d*e*m^2 + 24*b*d*e*m + 9*
b*d*e)*n)*x^2 + (a*d^2*m^5 + 11*a*d^2*m^4 + 47*a*d^2*m^3 + 97*a*d^2*m^2 +
96*a*d^2*m + 36*a*d^2 - (b*d^2*m^4 + 10*b*d^2*m^3 + 37*b*d^2*m^2 + 60*b*d^
2*m + 36*b*d^2)*n)*x + ((b*e^2*m^5 + 9*b*e^2*m^4 + 31*b*e^2*m^3 + 51*b*e^2
*m^2 + 40*b*e^2*m + 12*b*e^2)*x^3 + 2*(b*d*e*m^5 + 10*b*d*e*m^4 + 38*b*d*e
*m^3 + 68*b*d*e*m^2 + 57*b*d*e*m + 18*b*d*e)*x^2 + (b*d^2*m^5 + 11*b*d^2*m
^4 + 47*b*d^2*m^3 + 97*b*d^2*m^2 + 96*b*d^2*m + 36*b*d^2)*x)*log(c) + ((b*
e^2*m^5 + 9*b*e^2*m^4 + 31*b*e^2*m^3 + 51*b*e^2*m^2 + 40*b*e^2*m + 12*b*e^
2)*n*x^3 + 2*(b*d*e*m^5 + 10*b*d*e*m^4 + 38*b*d*e*m^3 + 68*b*d*e*m^2 + 57*
b*d*e*m + 18*b*d*e)*n*x^2 + (b*d^2*m^5 + 11*b*d^2*m^4 + 47*b*d^2*m^3 + 97*
b*d^2*m^2 + 96*b*d^2*m + 36*b*d^2)*n*x)*log(x))*e^(m*log(f) + m*log(x))/(m
^6 + 12*m^5 + 58*m^4 + 144*m^3 + 193*m^2 + 132*m + 36)
```

3.163.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 2791 vs. $2(146) = 292$.

Time = 3.51 (sec) , antiderivative size = 2791, normalized size of antiderivative = 18.24

$$\int (fx)^m(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx = \text{Too large to display}$$

input
```
integrate((f*x)**m*(e*x+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise(((-a*d**2/(2*x**2) - 2*a*d*e/x + a*e**2*log(x) + b*d**2*(-n/(4*x
**2) - log(c*x**n)/(2*x**2)) + 2*b*d*e*(-n/x - log(c*x**n)/x) - b*e**2*Pie
cewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)))/f**3, E
q(m, -3)), ((-a*d**2/x + 2*a*d*e*log(c*x**n)/n + a*e**2*x - b*d**2*n/x - b
*d**2*log(c*x**n)/x + b*d*e*log(c*x**n)**2/n - b*e**2*n*x + b*e**2*x*log(c
*x**n))/f**2, Eq(m, -2)), ((a*d**2*log(c*x**n)/n + 2*a*d*e*x + a*e**2*x**2
/2 + b*d**2*log(c*x**n)**2/(2*n) - 2*b*d*e*n*x + 2*b*d*e*x*log(c*x**n) - b
*e**2*n*x**2/4 + b*e**2*x**2*log(c*x**n)/2)/f, Eq(m, -1)), (a*d**2*m**5*x*
(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 1
1*a*d**2*m**4*x*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 +
 132*m + 36) + 47*a*d**2*m**3*x*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m
**3 + 193*m**2 + 132*m + 36) + 97*a*d**2*m**2*x*(f*x)**m/(m**6 + 12*m**5 +
 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 96*a*d**2*m*x*(f*x)**m/(m**
6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 36*a*d**2*x*(f
*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 2*a
*d*e*m**5*x**2*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 +
132*m + 36) + 20*a*d*e*m**4*x**2*(f*x)**m/(m**6 + 12*m**5 + 58*m**4 + 144*
m**3 + 193*m**2 + 132*m + 36) + 76*a*d*e*m**3*x**2*(f*x)**m/(m**6 + 12*m**
5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 136*a*d*e*m**2*x**2*(f*x
)**m/(m**6 + 12*m**5 + 58*m**4 + 144*m**3 + 193*m**2 + 132*m + 36) + 11...
```

3.163.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 195, normalized size of antiderivative = 1.27

$$\int (fx)^m(d+ex)^2(a+b\log(cx^n))\,dx = \frac{be^2f^mx^3x^m\log(cx^n)}{m+3} + \frac{ae^2f^mx^3x^m}{m+3} - \frac{be^2f^mnx^3x^m}{(m+3)^2} + \frac{2\,bdef^mx^2x^m\log(cx^n)}{m+2} + \frac{2\,adef^mx^2x^m}{m+2} - \frac{2\,bdef^mnx^2x^m}{(m+2)^2} - \frac{bd^2f^mnxx^m}{(m+1)^2} + \frac{(fx)^{m+1}bd^2\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}ad^2}{f(m+1)}$$

input
```
integrate((f*x)^m*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e^2*f^m*x^3*x^m*log(c*x^n)/(m + 3) + a*e^2*f^m*x^3*x^m/(m + 3) - b*e^2*f
^m*n*x^3*x^m/(m + 3)^2 + 2*b*d*e*f^m*x^2*x^m*log(c*x^n)/(m + 2) + 2*a*d*e*
f^m*x^2*x^m/(m + 2) - 2*b*d*e*f^m*n*x^2*x^m/(m + 2)^2 - b*d^2*f^m*n*x*x^m/
(m + 1)^2 + (f*x)^(m + 1)*b*d^2*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d
^2/(f*(m + 1))
```

3.163.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 374 vs. $2(153) = 306$.

Time = 0.34 (sec) , antiderivative size = 374, normalized size of antiderivative = 2.44

$$\int (fx)^m(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{be^2f^2f^mx^3x^m\log(c)}{f^2m+3\,f^2}+\frac{be^2f^mmnx^3x^m\log(x)}{m^2+6\,m+9} + \frac{ae^2f^2f^mx^3x^m}{f^2m+3\,f^2}+\frac{2\,bdef^mmnx^2x^m\log(x)}{m^2+4\,m+4} + \frac{3\,be^2f^mnx^3x^m\log(x)}{m^2+6\,m+9}-\frac{be^2f^mnx^3x^m}{m^2+6\,m+9} + \frac{bd^2f^mmnxx^m\log(x)}{m^2+2\,m+1}+\frac{4\,bdef^mnx^2x^m\log(x)}{m^2+4\,m+4} - \frac{2\,bdef^mnx^2x^m}{m^2+4\,m+4}+\frac{2\,bdef^mx^2x^m\log(c)}{m+2} + \frac{bd^2f^mnxx^m\log(x)}{m^2+2\,m+1}-\frac{bd^2f^mnxx^m}{m^2+2\,m+1} + \frac{2\,adef^mx^2x^m}{m+2}+\frac{(fx)^m\,bd^2x\log(c)}{m+1}+\frac{(fx)^m\,ad^2x}{m+1}$$

input
```
integrate((f*x)^m*(e*x+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e^2*f^2*f^m*x^3*x^m*log(c)/(f^2*m + 3*f^2) + b*e^2*f^m*m*n*x^3*x^m*log(x
)/(m^2 + 6*m + 9) + a*e^2*f^2*f^m*x^3*x^m/(f^2*m + 3*f^2) + 2*b*d*e*f^m*m*
n*x^2*x^m*log(x)/(m^2 + 4*m + 4) + 3*b*e^2*f^m*n*x^3*x^m*log(x)/(m^2 + 6*m
 + 9) - b*e^2*f^m*n*x^3*x^m/(m^2 + 6*m + 9) + b*d^2*f^m*m*n*x*x^m*log(x)/(
m^2 + 2*m + 1) + 4*b*d*e*f^m*n*x^2*x^m*log(x)/(m^2 + 4*m + 4) - 2*b*d*e*f^
m*n*x^2*x^m/(m^2 + 4*m + 4) + 2*b*d*e*f^m*x^2*x^m*log(c)/(m + 2) + b*d^2*f
^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - b*d^2*f^m*n*x*x^m/(m^2 + 2*m + 1) + 2*
a*d*e*f^m*x^2*x^m/(m + 2) + (f*x)^m*b*d^2*x*log(c)/(m + 1) + (f*x)^m*a*d^2
*x/(m + 1)
```

3.163.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m(d+ex)^2\left(a+b\log\left(cx^n\right)\right)\,dx = \int (f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,\left(d+e\,x\right)^2\,dx$$

input
```
int((f*x)^m*(a + b*log(c*x^n))*(d + e*x)^2,x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n))*(d + e*x)^2, x)
```

3.164 $\int (fx)^m(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx$

3.164.1 Optimal result

Integrand size = 21, antiderivative size = 95

$$\int (fx)^m(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{bdn(fx)^{1+m}}{f(1+m)^2}-\frac{ben(fx)^{2+m}}{f^2(2+m)^2}+\frac{d(fx)^{1+m}\left(a+b\log\left(cx^n\right)\right)}{f(1+m)}+\frac{e(fx)^{2+m}\left(a+b\log\left(cx^n\right)\right)}{f^2(2+m)}$$

output
```
-b*d*n*(f*x)^(1+m)/f/(1+m)^2-b*e*n*(f*x)^(2+m)/f^2/(2+m)^2+d*(f*x)^(1+m)*(
a+b*ln(c*x^n))/f/(1+m)+e*(f*x)^(2+m)*(a+b*ln(c*x^n))/f^2/(2+m)
```

3.164.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 64, normalized size of antiderivative = 0.67

$$\int (fx)^m(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx=x(fx)^m\left(-\frac{bdn}{(1+m)^2}-\frac{benx}{(2+m)^2}+\frac{d(a+b\log\left(cx^n\right))}{1+m}+\frac{ex(a+b\log\left(cx^n\right))}{2+m}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d*n)/(1 + m)^2) - (b*e*n*x)/(2 + m)^2 + (d*(a + b*Log[c*x^
n]))/(1 + m) + (e*x*(a + b*Log[c*x^n]))/(2 + m))
```

3.164.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 94, normalized size of antiderivative = 0.99, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2792, 53, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex)(fx)^m (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \; 2792$$

$$-bn\int (fx)^m\left(\frac{d}{m+1}+\frac{ex}{m+2}\right)dx+\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{e(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}$$

$$\Big\downarrow \; 53$$

$$-bn\int \left(\frac{d(fx)^m}{m+1}+\frac{e(fx)^{m+1}}{f(m+2)}\right)dx+\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{e(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}$$

$$\Big\downarrow \; 2009$$

$$\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{e(fx)^{m+2}(a+b\log(cx^n))}{f^2(m+2)}-bn\left(\frac{d(fx)^{m+1}}{f(m+1)^2}+\frac{e(fx)^{m+2}}{f^2(m+2)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d*(f*x)^(1 + m))/(f*(1 + m)^2) + (e*(f*x)^(2 + m))/(f^2*(2 + m)^2)
)) + (d*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m)) + (e*(f*x)^(2 + m)*(
a + b*Log[c*x^n]))/(f^2*(2 + m))
```

3.164.3.1 Defintions of rubi rules used

rule 53
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && LeQ[7*m + 4*n + 4, 0])
|| LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.164.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 352 vs. $2(95) = 190$.

Time = 0.22 (sec) , antiderivative size = 353, normalized size of antiderivative = 3.72

method	result
parallelrisch	$-\frac{-2x^2(fx)^m ae-4x(fx)^m ad-x^2(fx)^m ae\, m^3-4x^2(fx)^m ae\, m^2-x(fx)^m ad\, m^3-5x^2(fx)^m aem+x^2(fx)^m ben-5x(fx)^m ad}{}$
risch	Expression too large to display

input
```
int((f*x)^m*(e*x+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-2*x^2*(f*x)^m*a*e-4*x*(f*x)^m*a*d-x^2*(f*x)^m*a*e*m^3-4*x^2*(f*x)^m*a*e
*m^2-x*(f*x)^m*a*d*m^3-5*x^2*(f*x)^m*a*e*m+x^2*(f*x)^m*b*e*n-5*x*(f*x)^m*a
*d*m^2-8*x*(f*x)^m*a*d*m+4*x*(f*x)^m*b*d*n-4*x*(f*x)^m*ln(c*x^n)*b*d-2*x^2
*(f*x)^m*ln(c*x^n)*b*e-x^2*(f*x)^m*ln(c*x^n)*b*e*m^3-4*x^2*(f*x)^m*ln(c*x^
n)*b*e*m^2+x^2*(f*x)^m*b*e*m^2*n-x*(f*x)^m*ln(c*x^n)*b*d*m^3-5*x^2*(f*x)^m
*ln(c*x^n)*b*e*m+2*x^2*(f*x)^m*b*e*m*n-5*x*(f*x)^m*ln(c*x^n)*b*d*m^2+x*(f*
x)^m*b*d*m^2*n-8*x*(f*x)^m*ln(c*x^n)*b*d*m+4*x*(f*x)^m*b*d*m*n)/(m^2+4*m+4
)/(m^2+2*m+1)
```

3.164.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 235 vs. $2(95) = 190$.

Time = 0.33 (sec) , antiderivative size = 235, normalized size of antiderivative = 2.47

$$\int (fx)^m(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{((aem^3+4\,aem^2+5\,aem+2\,ae-(bem^2+2\,bem+be)n)x^2+(adm^3+5\,adm^2+8\,adm+4\,ad-(bdm^2}{}$$

input
```
integrate((f*x)^m*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((a*e*m^3 + 4*a*e*m^2 + 5*a*e*m + 2*a*e - (b*e*m^2 + 2*b*e*m + b*e)*n)*x^2
 + (a*d*m^3 + 5*a*d*m^2 + 8*a*d*m + 4*a*d - (b*d*m^2 + 4*b*d*m + 4*b*d)*n)
*x + ((b*e*m^3 + 4*b*e*m^2 + 5*b*e*m + 2*b*e)*x^2 + (b*d*m^3 + 5*b*d*m^2 +
 8*b*d*m + 4*b*d)*x)*log(c) + ((b*e*m^3 + 4*b*e*m^2 + 5*b*e*m + 2*b*e)*n*x
^2 + (b*d*m^3 + 5*b*d*m^2 + 8*b*d*m + 4*b*d)*n*x)*log(x))*e^(m*log(f) + m*
log(x))/(m^4 + 6*m^3 + 13*m^2 + 12*m + 4)
```

3.164.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 899 vs. $2(87) = 174$.

Time = 2.39 (sec) , antiderivative size = 899, normalized size of antiderivative = 9.46

$$\int (fx)^m(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \begin{cases} \frac{-\frac{ad}{x}+ae\log(x)+bd\left(-\frac{n}{x}-\frac{\log(cx^n)}{x}\right)-be\left(\begin{cases}-\log(c)\log(x) & \text{for } n=0\\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise}\end{cases}\right)}{f^2} \\ \frac{\frac{ad\log(cx^n)}{n}+aex+\frac{bd\log(cx^n)^2}{2n}-benx+bex\log(cx^n)}{f} \\ \frac{adm^3x(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{5adm^2x(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{8admx(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{4adx(fx)^m}{m^4+6m^3+13m^2+12m+4}+\frac{aem^3x^2(fx)}{m^4+6m^3+13m^2+} \end{cases}$$

input
```
integrate((f*x)**m*(e*x+d)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise(((-a*d/x + a*e*log(x) + b*d*(-n/x - log(c*x**n)/x) - b*e*Piecewi
se((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)))/f**2, Eq(m,
 -2)), ((a*d*log(c*x**n)/n + a*e*x + b*d*log(c*x**n)**2/(2*n) - b*e*n*x +
b*e*x*log(c*x**n))/f, Eq(m, -1)), (a*d*m**3*x*(f*x)**m/(m**4 + 6*m**3 + 13
*m**2 + 12*m + 4) + 5*a*d*m**2*x*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m
+ 4) + 8*a*d*m*x*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + 4*a*d*x*(
f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + a*e*m**3*x**2*(f*x)**m/(m**
4 + 6*m**3 + 13*m**2 + 12*m + 4) + 4*a*e*m**2*x**2*(f*x)**m/(m**4 + 6*m**3
 + 13*m**2 + 12*m + 4) + 5*a*e*m*x**2*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 +
12*m + 4) + 2*a*e*x**2*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + b*d
*m**3*x*(f*x)**m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) - b*d*m*
*2*n*x*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + 5*b*d*m**2*x*(f*x)*
*m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) - 4*b*d*m*n*x*(f*x)**m
/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + 8*b*d*m*x*(f*x)**m*log(c*x**n)/(m*
*4 + 6*m**3 + 13*m**2 + 12*m + 4) - 4*b*d*n*x*(f*x)**m/(m**4 + 6*m**3 + 13
*m**2 + 12*m + 4) + 4*b*d*x*(f*x)**m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2
+ 12*m + 4) + b*e*m**3*x**2*(f*x)**m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2
+ 12*m + 4) - b*e*m**2*n*x**2*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4
) + 4*b*e*m**2*x**2*(f*x)**m*log(c*x**n)/(m**4 + 6*m**3 + 13*m**2 + 12*m +
 4) - 2*b*e*m*n*x**2*(f*x)**m/(m**4 + 6*m**3 + 13*m**2 + 12*m + 4) + 5*...
```

3.164.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 119, normalized size of antiderivative = 1.25

$$\int (fx)^m(d+ex)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{bef^mx^2x^m\log\left(cx^n\right)}{m+2}+\frac{aef^mx^2x^m}{m+2}-\frac{bef^mnx^2x^m}{(m+2)^2} - \frac{bdf^mnxx^m}{(m+1)^2}+\frac{(fx)^{m+1}\,bd\log\left(cx^n\right)}{f(m+1)}+\frac{(fx)^{m+1}\,ad}{f(m+1)}$$

input
```
integrate((f*x)^m*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e*f^m*x^2*x^m*log(c*x^n)/(m + 2) + a*e*f^m*x^2*x^m/(m + 2) - b*e*f^m*n*x
^2*x^m/(m + 2)^2 - b*d*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*d*log(c*x^n
)/(f*(m + 1)) + (f*x)^(m + 1)*a*d/(f*(m + 1))
```

3.164.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 212 vs. $2(95) = 190$.

Time = 0.33 (sec) , antiderivative size = 212, normalized size of antiderivative = 2.23

$$\int (fx)^m(d+ex)\,(a+b\log{(cx^n)})\;dx = \frac{bef^mmnx^2x^m\log{(x)}}{m^2+4\,m+4}+\frac{bdf^mmnxx^m\log{(x)}}{m^2+2\,m+1}+\frac{2\,bef^mnx^2x^m\log{(x)}}{m^2+4\,m+4}-\frac{bef^mnx^2x^m}{m^2+4\,m+4}+\frac{bef^mx^2x^m\log{(c)}}{m+2}+\frac{bdf^mnxx^m\log{(x)}}{m^2+2\,m+1}-\frac{bdf^mnxx^m}{m^2+2\,m+1}+\frac{aef^mx^2x^m}{m+2}+\frac{(fx)^m\,bdx\log{(c)}}{m+1}+\frac{(fx)^m\,adx}{m+1}$$

input
```
integrate((f*x)^m*(e*x+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*f^m*m*n*x^2*x^m*log(x)/(m^2 + 4*m + 4) + b*d*f^m*m*n*x*x^m*log(x)/(m^2
 + 2*m + 1) + 2*b*e*f^m*n*x^2*x^m*log(x)/(m^2 + 4*m + 4) - b*e*f^m*n*x^2*x
^m/(m^2 + 4*m + 4) + b*e*f^m*x^2*x^m*log(c)/(m + 2) + b*d*f^m*n*x*x^m*log(
x)/(m^2 + 2*m + 1) - b*d*f^m*n*x*x^m/(m^2 + 2*m + 1) + a*e*f^m*x^2*x^m/(m
+ 2) + (f*x)^m*b*d*x*log(c)/(m + 1) + (f*x)^m*a*d*x/(m + 1)
```

3.164.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m(d+ex)\,(a+b\log{(cx^n)})\;dx = \int {\left(f\,x\right)}^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,\left(d+e\,x\right) \,d x$$

input
```
int((f*x)^m*(a + b*log(c*x^n))*(d + e*x),x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n))*(d + e*x), x)
```

3.165 $\int (fx)^m (a + b\log(cx^n)) \, dx$

3.165.1 Optimal result

Integrand size = 16, antiderivative size = 46

$$\int (fx)^m (a + b\log(cx^n)) \, dx = -\frac{bn(fx)^{1+m}}{f(1+m)^2} + \frac{(fx)^{1+m}(a + b\log(cx^n))}{f(1+m)}$$

output
```
-b*n*(f*x)^(1+m)/f/(1+m)^2+(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)
```

3.165.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.70

$$\int (fx)^m (a + b\log(cx^n)) \, dx = \frac{x(fx)^m(a + am - bn + b(1+m)\log(cx^n))}{(1+m)^2}$$

input
```
Integrate[(f*x)^m*(a + b*Log[c*x^n]),x]
```

output
```
(x*(f*x)^m*(a + a*m - b*n + b*(1 + m)*Log[c*x^n]))/(1 + m)^2
```

3.165.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.062$, Rules used = {2741}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (a + b\log (cx^n))\,dx$$

$$\Big\downarrow \; 2741$$

$$\frac{(fx)^{m+1}(a + b\log (cx^n))}{f(m+1)} - \frac{bn(fx)^{m+1}}{f(m+1)^2}$$

input
```
Int[(f*x)^m*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*(f*x)^(1 + m))/(f*(1 + m)^2)) + ((f*x)^(1 + m)*(a + b*Log[c*x^n]))/
(f*(1 + m))
```

3.165.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

3.165.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.48

method	result
parallelrisch	$-\frac{-x(fx)^m \ln(c\,x^n)bm - x(fx)^m \ln(c\,x^n)b - x(fx)^m am + x(fx)^m bn - x(fx)^m a}{(1+m)^2}$
risch	$\frac{bx\,x^m f^m \mathrm{e}^{\frac{i\,\mathrm{csgn}(ifx)\pi m(\mathrm{csgn}(ifx)-\mathrm{csgn}(ix))(-\,\mathrm{csgn}(ifx)+\mathrm{csgn}(if))}{2}} \ln(x^n)}{1+m} - \frac{\left(i\pi b\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)m - i\pi b\ \mathrm{csgn}(i\right.}{}$

input
```
int((f*x)^m*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-x*(f*x)^m*ln(c*x^n)*b*m-x*(f*x)^m*ln(c*x^n)*b-x*(f*x)^m*a*m+x*(f*x)^m*b
*n-x*(f*x)^m*a)/(1+m)^2
```

3.165.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.13

$$\int (fx)^m (a+b\log(cx^n))\,dx = \frac{((bm+b)nx\log(x)+(bm+b)x\log(c)+(am-bn+a)x)e^{(m\log(f)+m\log(x))}}{m^2+2m+1}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((b*m + b)*n*x*log(x) + (b*m + b)*x*log(c) + (a*m - b*n + a)*x)*e^(m*log(f
) + m*log(x))/(m^2 + 2*m + 1)
```

3.165.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 141 vs. 2(37) = 74.

Time = 2.07 (sec) , antiderivative size = 141, normalized size of antiderivative = 3.07

$$\int (fx)^m (a+b\log(cx^n))\,dx = \begin{cases} \frac{amx(fx)^m}{m^2+2m+1}+\frac{ax(fx)^m}{m^2+2m+1}+\frac{bmx(fx)^m\log(cx^n)}{m^2+2m+1}-\frac{bnx(fx)^m}{m^2+2m+1}+\frac{bx(fx)^m\log(cx^n)}{m^2+2m+1} & \text{for } m\neq -1 \\ \frac{\begin{cases} a\log(x) & \text{for } b=0 \\ -(-a-b\log(c))\log(x) & \text{for } n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}}{f} & \text{otherwise} \end{cases}$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*m*x*(f*x)**m/(m**2 + 2*m + 1) + a*x*(f*x)**m/(m**2 + 2*m + 1)
 + b*m*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1) - b*n*x*(f*x)**m/(m**2 + 2*
m + 1) + b*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1), Ne(m, -1)), (Piecewise
((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c
*x**n))**2/(2*b*n), True))/f, True))
```

3.165.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.24

$$\int (fx)^m (a+b\log(cx^n))\,dx = -\frac{bf^m nxx^m}{(m+1)^2}+\frac{(fx)^{m+1}b\log(cx^n)}{f(m+1)}+\frac{(fx)^{m+1}a}{f(m+1)}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*log(c*x^n)/(f*(m + 1)) + (f*x)^
(m + 1)*a/(f*(m + 1))
```

3.165.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. 2(46) = 92.

Time = 0.38 (sec) , antiderivative size = 95, normalized size of antiderivative = 2.07

$$\int (fx)^m (a+b\log(cx^n))\,dx = \frac{bf^m mnxx^m\log(x)}{m^2+2m+1}+\frac{bf^m nxx^m\log(x)}{m^2+2m+1}-\frac{bf^m nxx^m}{m^2+2m+1}+\frac{(fx)^m bx\log(c)}{m+1}+\frac{(fx)^m ax}{m+1}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*f^m*n*x*x^m*log(x)/(m^2 + 2*m +
 1) - b*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*x*log(c)/(m + 1) + (f*x)^m
*a*x/(m + 1)
```

3.165.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m (a+b\log(cx^n))\,dx = \int (f\,x)^m\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int((f*x)^m*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n)), x)
```

3.166 $\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex}\,dx$

3.166.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex}\,dx=\text{Int}\left(\frac{(fx)^m(a+b\log(cx^n))}{d+ex},x\right)$$

output
```
Unintegrable((f*x)^m*(a+b*ln(c*x^n))/(e*x+d),x)
```

3.166.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 72 vs. 2(26) = 52.

Time = 0.13 (sec) , antiderivative size = 72, normalized size of antiderivative = 3.13

$$\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex}\,dx = \frac{x(fx)^m\left(-bn\,{}_3F_2\left(1,1+m,1+m;2+m,2+m;-\frac{ex}{d}\right)+(1+m)\,\text{Hypergeometric2F1}\left(1,1+m,2+m,-\right.\right.}{d(1+m)^2}$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
(x*(f*x)^m*(-(b*n*HypergeometricPFQ[{1, 1 + m, 1 + m}, {2 + m, 2 + m}, -((
e*x)/d)]) + (1 + m)*Hypergeometric2F1[1, 1 + m, 2 + m, -((e*x)/d)]*(a + b*
Log[c*x^n])))/(d*(1 + m)^2)
```

3.166.3 Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a+b\log(cx^n))}{d+ex}dx$$
$$\Big\downarrow \ 2796$$
$$\int \frac{(fx)^m (a+b\log(cx^n))}{d+ex}dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x),x]
```

output
```
$Aborted
```

3.166.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.166.4 Maple [N/A]

Not integrable

Time = 0.04 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a+b\ln(c\,x^n))}{ex+d}dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x+d),x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x+d),x)
```

3.166.5 Fricas [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.35

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex}\, dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{ex + d}\, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d),x, algorithm="fricas")
```

output
```
integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(e*x + d), x)
```

3.166.6 Sympy [N/A]

Not integrable

Time = 2.08 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex}\, dx = \int \frac{(fx)^m (a + b\log(cx^n))}{d + ex}\, dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))/(e*x+d),x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x), x)
```

3.166.7 Maxima [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex}\, dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{ex + d}\, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x + d), x)
```

3.166.8 Giac [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{(fx)^m (a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(b\log(cx^n)+a)(fx)^m}{ex+d}\,dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x + d), x)
```

3.166.9 Mupad [N/A]

Not integrable

Time = 0.47 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{(fx)^m (a+b\log(cx^n))}{d+ex}\,dx = \int \frac{(f\,x)^m\,(a+b\,\ln(c\,x^n))}{d+e\,x}\,dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x),x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x), x)
```

3.167 $\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex)^2}\,dx$

3.167.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{(fx)^m\,(a+b\log(cx^n))}{(d+ex)^2}\,dx=\text{Int}\left(\frac{(fx)^m\,(a+b\log(cx^n))}{(d+ex)^2},x\right)$$

output
```
Unintegrable((f*x)^m*(a+b*ln(c*x^n))/(e*x+d)^2,x)
```

3.167.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 72 vs. 2(26) = 52.

Time = 0.12 (sec) , antiderivative size = 72, normalized size of antiderivative = 3.13

$$\int \frac{(fx)^m\,(a+b\log(cx^n))}{(d+ex)^2}\,dx$$
$$=\frac{x(fx)^m\left(-bn\,{}_3F_2\left(2,1+m,1+m;2+m,2+m;-\frac{ex}{d}\right)+(1+m)\,\text{Hypergeometric2F1}\left(2,1+m,2+m,-\right.\right.}{d^2(1+m)^2}$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
(x*(f*x)^m*(-(b*n*HypergeometricPFQ[{2, 1 + m, 1 + m}, {2 + m, 2 + m}, -((
e*x)/d)]) + (1 + m)*Hypergeometric2F1[2, 1 + m, 2 + m, -((e*x)/d)]*(a + b*
Log[c*x^n])))/(d^2*(1 + m)^2)
```

3.167.3 Rubi [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d+ex)^2} dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d+ex)^2} dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x)^2,x]
```

output
```
$Aborted
```

3.167.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.167.4 Maple [N/A]

Not integrable

Time = 0.04 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a + b\ln(c\,x^n))}{(ex+d)^2} dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x+d)^2,x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x+d)^2,x)
```

3.167.5 Fricas [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.83

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d+ex)^2} dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex+d)^2} dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="fricas")
```

output
```
integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(e^2*x^2 + 2*d*e*x + d^2), x)
```

3.167.6 Sympy [N/A]

Not integrable

Time = 4.03 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d+ex)^2} dx = \int \frac{(fx)^m (a + b\log(cx^n))}{(d+ex)^2} dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))/(e*x+d)**2,x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x)**2, x)
```

3.167.7 Maxima [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d+ex)^2} dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex+d)^2} dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x + d)^2, x)
```

3.167.8 Giac [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex)^2} \, dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex + d)^2} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x + d)^2, x)
```

3.167.9 Mupad [N/A]

Not integrable

Time = 0.51 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex)^2} \, dx = \int \frac{(f\,x)^m\,(a + b\,\ln(c\,x^n))}{(d + e\,x)^2} \, dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x)^2,x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x)^2, x)
```

3.168 $\int x(a+bx)^m \log(cx^n)\,dx$

3.168.1 Optimal result

Integrand size = 15, antiderivative size = 15

$$\int x(a+bx)^m \log(cx^n)\,dx = \text{Int}(x(a+bx)^m \log(cx^n), x)$$

output
```
Unintegrable(x*(b*x+a)^m*ln(c*x^n),x)
```

3.168.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 173 vs. 2(18) = 36.

Time = 0.16 (sec) , antiderivative size = 173, normalized size of antiderivative = 11.53

$$\int x(a+bx)^m \log(cx^n)\,dx$$
$$= \frac{(a+bx)^m\left(1+\frac{bx}{a}\right)^{-m}\left(-n\left(2abx\left(1+\frac{bx}{a}\right)^m+b^2x^2\left(1+\frac{bx}{a}\right)^m+a^2\left(-1+\left(1+\frac{bx}{a}\right)^m\right)\right)+ab(2+m)nx\,{}_3F_2(\right.}{b^2(1+m)}$$

input
```
Integrate[x*(a + b*x)^m*Log[c*x^n],x]
```

output
```
((a + b*x)^m*(-(n*(2*a*b*x*(1 + (b*x)/a)^m + b^2*x^2*(1 + (b*x)/a)^m + a^2
*(-1 + (1 + (b*x)/a)^m))) + a*b*(2 + m)*n*x*HypergeometricPFQ[{1, 1, -1 -
m}, {2, 2}, -((b*x)/a)] + (a*b*m*x*(1 + (b*x)/a)^m + b^2*(1 + m)*x^2*(1 +
(b*x)/a)^m - a^2*(-1 + (1 + (b*x)/a)^m))*Log[c*x^n]))/(b^2*(1 + m)*(2 + m)
*(1 + (b*x)/a)^m)
```

3.168.3 Rubi [N/A]

Not integrable

Time = 0.16 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(a+bx)^m \log(cx^n)\,dx$$
$$\Big\downarrow \; 2796$$
$$\int x(a+bx)^m \log(cx^n)\,dx$$

input
```
Int[x*(a + b*x)^m*Log[c*x^n],x]
```

output
```
$Aborted
```

3.168.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.168.4 Maple [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int x(bx+a)^m \ln(c\,x^n)\,dx$$

input
```
int(x*(b*x+a)^m*ln(c*x^n),x)
```

output
```
int(x*(b*x+a)^m*ln(c*x^n),x)
```

3.168.5 Fricas [N/A]

Not integrable

Time = 0.33 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

$$\int x(a+bx)^m \log(cx^n)\, dx = \int (bx+a)^m x \log(cx^n)\, dx$$

input
```
integrate(x*(b*x+a)^m*log(c*x^n),x, algorithm="fricas")
```

output
```
integral((b*x + a)^m*x*log(c*x^n), x)
```

3.168.6 Sympy [N/A]

Not integrable

Time = 7.50 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int x(a+bx)^m \log(cx^n)\, dx = \int x(a+bx)^m \log(cx^n)\, dx$$

input
```
integrate(x*(b*x+a)**m*ln(c*x**n),x)
```

output
```
Integral(x*(a + b*x)**m*log(c*x**n), x)
```

3.168.7 Maxima [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 112, normalized size of antiderivative = 7.47

$$\int x(a+bx)^m \log(cx^n)\, dx = \int (bx+a)^m x \log(cx^n)\, dx$$

input
```
integrate(x*(b*x+a)^m*log(c*x^n),x, algorithm="maxima")
```

output
```
(b^2*(m + 1)*x^2 + a*b*m*x - a^2)*(b*x + a)^m*log(x^n)/((m^2 + 3*m + 2)*b^
2) + integrate(-(a*b*m*n*x + (m*n - (m^2 + 3*m + 2)*log(c) + n)*b^2*x^2 -
a^2*n)*(b*x + a)^m/x, x)/((m^2 + 3*m + 2)*b^2)
```

3.168.8 Giac [N/A]

Not integrable

Time = 0.42 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

$$\int x(a+bx)^m \log (cx^n) \, dx = \int (bx+a)^m x \log (cx^n) \, dx$$

input
```
integrate(x*(b*x+a)^m*log(c*x^n),x, algorithm="giac")
```

output
```
integrate((b*x + a)^m*x*log(c*x^n), x)
```

3.168.9 Mupad [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.13

$$\int x(a+bx)^m \log (cx^n) \, dx = \int x \, \ln (c\,x^n) \, (a+b\,x)^m \, dx$$

input
```
int(x*log(c*x^n)*(a + b*x)^m,x)
```

output
```
int(x*log(c*x^n)*(a + b*x)^m, x)
```

3.169 $\int (a+bx)^m \log(cx^n)\,dx$

3.169.1 Optimal result

Integrand size = 14, antiderivative size = 68

$$\int (a+bx)^m \log(cx^n)\,dx = \frac{n(a+bx)^{2+m}\,\text{Hypergeometric2F1}\left(1,2+m,3+m,1+\frac{bx}{a}\right)}{ab\,(2+3m+m^2)} + \frac{(a+bx)^{1+m}\log(cx^n)}{b(1+m)}$$

output
```
n*(b*x+a)^(2+m)*hypergeom([1, 2+m],[3+m],1+b*x/a)/a/b/(m^2+3*m+2)+(b*x+a)^
(1+m)*ln(c*x^n)/b/(1+m)
```

3.169.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 61, normalized size of antiderivative = 0.90

$$\int (a+bx)^m \log(cx^n)\,dx = \frac{(a+bx)^{1+m}\left(n(a+bx)\,\text{Hypergeometric2F1}\left(1,2+m,3+m,1+\frac{bx}{a}\right)+a(2+m)\log(cx^n)\right)}{ab(1+m)(2+m)}$$

input
```
Integrate[(a + b*x)^m*Log[c*x^n],x]
```

output
```
((a + b*x)^(1 + m)*(n*(a + b*x)*Hypergeometric2F1[1, 2 + m, 3 + m, 1 + (b*
x)/a] + a*(2 + m)*Log[c*x^n]))/(a*b*(1 + m)*(2 + m))
```

3.169.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2756, 75}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (a+bx)^m \log \left(cx^n\right) \, dx$$

$$\Big\downarrow \text{2756}$$

$$\frac{(a+bx)^{m+1} \log \left(cx^n\right)}{b(m+1)}-\frac{n \int \frac{(a+bx)^{m+1}}{x}dx}{b(m+1)}$$

$$\Big\downarrow \text{75}$$

$$\frac{(a+bx)^{m+1} \log \left(cx^n\right)}{b(m+1)}+\frac{n(a+bx)^{m+2} \text{Hypergeometric2F1}\left(1,m+2,m+3,\frac{bx}{a}+1\right)}{ab(m+1)(m+2)}$$

input
```
Int[(a + b*x)^m*Log[c*x^n],x]
```

output
```
(n*(a + b*x)^(2 + m)*Hypergeometric2F1[1, 2 + m, 3 + m, 1 + (b*x)/a])/(a*b
*(1 + m)*(2 + m)) + ((a + b*x)^(1 + m)*Log[c*x^n])/(b*(1 + m))
```

3.169.3.1 Defintions of rubi rules used

rule 75
```
Int[((b_.)*(x_))^(m_)*((c_) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[((c + d*x
)^(n + 1)/(d*(n + 1)*(-d/(b*c))^m))*Hypergeometric2F1[-m, n + 1, n + 2, 1 +
 d*(x/c)], x] /; FreeQ[{b, c, d, m, n}, x] &&  !IntegerQ[n] && (IntegerQ[m]
 || GtQ[-d/(b*c), 0])
```

rule 2756
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_.),
x_Symbol] :> Simp[(d + e*x)^(q + 1)*((a + b*Log[c*x^n])^p/(e*(q + 1))), x]
- Simp[b*n*(p/(e*(q + 1)))   Int[((d + e*x)^(q + 1)*(a + b*Log[c*x^n])^(p -
 1))/x, x], x] /; FreeQ[{a, b, c, d, e, n, p, q}, x] && GtQ[p, 0] && NeQ[q,
 -1] && (EqQ[p, 1] || (IntegersQ[2*p, 2*q] &&  !IGtQ[q, 0]) || (EqQ[p, 2] &
& NeQ[q, 1]))
```

3.169.4 Maple [F]

$$\int (bx+a)^m \ln(c\,x^n)\,dx$$

input
```
int((b*x+a)^m*ln(c*x^n),x)
```

output
```
int((b*x+a)^m*ln(c*x^n),x)
```

3.169.5 Fricas [F]

$$\int (a+bx)^m \log(cx^n)\ dx = \int (bx+a)^m \log(cx^n)\ dx$$

input
```
integrate((b*x+a)^m*log(c*x^n),x, algorithm="fricas")
```

output
```
integral((b*x + a)^m*log(c*x^n), x)
```

3.169.6 Sympy [A] (verification not implemented)

Time = 6.24 (sec) , antiderivative size = 238, normalized size of antiderivative = 3.50

$$\int (a+bx)^m \log(cx^n)\,dx = -n\left(\begin{cases} a^m x \\ -\frac{b^{m+2}m\left(\frac{a}{b}+x\right)^{m+2}\Phi\left(1+\frac{bx}{a},1,m+2\right)\Gamma(m+2)}{abm\Gamma(m+3)+ab\Gamma(m+3)} - \frac{2b^{m+2}\left(\frac{a}{b}+x\right)^{m+2}\Phi\left(1+\frac{bx}{a},1,m+2\right)\Gamma(m+2)}{abm\Gamma(m+3)+ab\Gamma(m+3)} \\ \frac{\begin{cases} -\operatorname{Li}_2\left(\frac{bxe^{i\pi}}{a}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ \log(a)\log(x)-\operatorname{Li}_2\left(\frac{bxe^{i\pi}}{a}\right) & \text{for } |x|<1 \\ -\log(a)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{bxe^{i\pi}}{a}\right) & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(a)+G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(a)-\operatorname{Li}_2\left(\frac{bxe^{i\pi}}{a}\right) & \text{otherwise} \end{cases}}{b} \end{cases}\right) + \left(\begin{cases} a^m x & \text{for } b=0 \\ \frac{\begin{cases} \frac{(a+bx)^{m+1}}{m+1} & \text{for } m\neq -1 \\ \log(a+bx) & \text{otherwise} \end{cases}}{b} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate((b*x+a)**m*ln(c*x**n),x)
```

output
```
-n*Piecewise((a**m*x, Eq(b, 0) | (Eq(b, 0) & Ne(m, -1))), (-b**(m + 2)*m*(
a/b + x)**(m + 2)*lerchphi(1 + b*x/a, 1, m + 2)*gamma(m + 2)/(a*b*m*gamma(
m + 3) + a*b*gamma(m + 3)) - 2*b**(m + 2)*(a/b + x)**(m + 2)*lerchphi(1 +
b*x/a, 1, m + 2)*gamma(m + 2)/(a*b*m*gamma(m + 3) + a*b*gamma(m + 3)), (m
> -oo) & (m < oo) & Ne(m, -1)), (Piecewise((-polylog(2, b*x*exp_polar(I*pi
)/a), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(a)*log(x) - polylog(2, b*x*exp_
polar(I*pi)/a), Abs(x) < 1), (-log(a)*log(1/x) - polylog(2, b*x*exp_polar(
I*pi)/a), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(a) +
 meijerg(((1, 1), ()), ((), (0, 0)), x)*log(a) - polylog(2, b*x*exp_polar(
I*pi)/a), True))/b, True)) + Piecewise((a**m*x, Eq(b, 0)), (Piecewise(((a
+ b*x)**(m + 1)/(m + 1), Ne(m, -1)), (log(a + b*x), True))/b, True))*log(c
*x**n)
```

3.169.7 Maxima [F]

$$\int (a+bx)^m \log (cx^n) \, dx = \int (bx+a)^m \log (cx^n) \, dx$$

input
```
integrate((b*x+a)^m*log(c*x^n),x, algorithm="maxima")
```

output
```
(b*x + a)*(b*x + a)^m*log(x^n)/(b*(m + 1)) + integrate((((m + 1)*log(c) -
n)*b*x - a*n)*(b*x + a)^m/x, x)/(b*(m + 1))
```

3.169.8 Giac [F]

$$\int (a+bx)^m \log (cx^n) \, dx = \int (bx+a)^m \log (cx^n) \, dx$$

input
```
integrate((b*x+a)^m*log(c*x^n),x, algorithm="giac")
```

output
```
integrate((b*x + a)^m*log(c*x^n), x)
```

3.169.9 Mupad [F(-1)]

Timed out.

$$\int (a+bx)^m \log (cx^n) \, dx = \int \ln (c\,x^n) \, (a+b\,x)^m \, dx$$

input
```
int(log(c*x^n)*(a + b*x)^m,x)
```

output
```
int(log(c*x^n)*(a + b*x)^m, x)
```

3.170 $\int \frac{(a+bx)^m \log(cx^n)}{x} dx$

3.170.1 Optimal result

Integrand size = 17, antiderivative size = 17

$$\int \frac{(a+bx)^m \log(cx^n)}{x} dx = \operatorname{Int}\left(\frac{(a+bx)^m \log(cx^n)}{x}, x\right)$$

output
```
Unintegrable((b*x+a)^m*ln(c*x^n)/x,x)
```

3.170.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 89 vs. 2(20) = 40.

Time = 0.04 (sec) , antiderivative size = 89, normalized size of antiderivative = 5.24

$$\int \frac{(a+bx)^m \log(cx^n)}{x} dx = \frac{\left(1+\frac{a}{bx}\right)^{-m} (a+bx)^m \left(-n\,{}_3F_2\left(-m,-m,-m;1-m,1-m;-\frac{a}{bx}\right)+m\,\text{Hypergeometric2F1}\left(-m,-m,1\right.\right.}{m^2}$$

input
```
Integrate[((a + b*x)^m*Log[c*x^n])/x,x]
```

output
```
((a + b*x)^m*(-(n*HypergeometricPFQ[{-m, -m, -m}, {1 - m, 1 - m}, -(a/(b*x
))]) + m*Hypergeometric2F1[-m, -m, 1 - m, -(a/(b*x))]*Log[c*x^n]))/(m^2*(1
 + a/(b*x))^m)
```

3.170.3 Rubi [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+bx)^m \log\left(cx^n\right)}{x} \, dx$$

$$\Big\downarrow \; 2796$$

$$\int \frac{(a+bx)^m \log\left(cx^n\right)}{x}dx$$

input
```
Int[((a + b*x)^m*Log[c*x^n])/x,x]
```

output
```
$Aborted
```

3.170.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.170.4 Maple [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{(bx+a)^m \ln\left(c\,x^n\right)}{x}dx$$

input
```
int((b*x+a)^m*ln(c*x^n)/x,x)
```

output
```
int((b*x+a)^m*ln(c*x^n)/x,x)
```

3.170.5 Fricas [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{(a+bx)^m \log(cx^n)}{x} \, dx = \int \frac{(bx+a)^m \log(cx^n)}{x} \, dx$$

input
```
integrate((b*x+a)^m*log(c*x^n)/x,x, algorithm="fricas")
```

output
```
integral((b*x + a)^m*log(c*x^n)/x, x)
```

3.170.6 Sympy [N/A]

Not integrable

Time = 4.98 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.88

$$\int \frac{(a+bx)^m \log(cx^n)}{x} \, dx = \int \frac{(a+bx)^m \log(cx^n)}{x} \, dx$$

input
```
integrate((b*x+a)**m*ln(c*x**n)/x,x)
```

output
```
Integral((a + b*x)**m*log(c*x**n)/x, x)
```

3.170.7 Maxima [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{(a+bx)^m \log(cx^n)}{x} \, dx = \int \frac{(bx+a)^m \log(cx^n)}{x} \, dx$$

input
```
integrate((b*x+a)^m*log(c*x^n)/x,x, algorithm="maxima")
```

output
```
integrate((b*x + a)^m*log(c*x^n)/x, x)
```

3.170.8 Giac [F(-2)]

Exception generated.

$$\int \frac{(a+bx)^m \log(cx^n)}{x} \, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((b*x+a)^m*log(c*x^n)/x,x, algorithm="giac")
```

output
```
Exception raised: RuntimeError >> an error occurred running a Giac command
:INPUT:sage2OUTPUT:Unable to divide, perhaps due to rounding error%%%{1,[0
,1,0]%%%} / %%%{1,[0,0,1]%%%} Error: Bad Argument Value
```

3.170.9 Mupad [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 19, normalized size of antiderivative = 1.12

$$\int \frac{(a+bx)^m \log(cx^n)}{x} \, dx = \int \frac{\ln(c\,x^n)\,(a+b\,x)^m}{x} \, dx$$

input
```
int((log(c*x^n)*(a + b*x)^m)/x,x)
```

output
```
int((log(c*x^n)*(a + b*x)^m)/x, x)
```

3.171 $\int x^5(d+ex^2)(a+b\log(cx^n))\,dx$

3.171.1 Optimal result

Integrand size = 21, antiderivative size = 48

$$\int x^5(d+ex^2)(a+b\log(cx^n))\,dx=-\frac{1}{36}bdnx^6-\frac{1}{64}benx^8+\frac{1}{24}(4dx^6+3ex^8)(a+b\log(cx^n))$$

output
```
-1/36*b*d*n*x^6-1/64*b*e*n*x^8+1/24*(3*e*x^8+4*d*x^6)*(a+b*ln(c*x^n))
```

3.171.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^5(d+ex^2)(a+b\log(cx^n))\,dx=\frac{1}{6}adx^6-\frac{1}{36}bdnx^6+\frac{1}{8}aex^8-\frac{1}{64}benx^8+\frac{1}{6}bdx^6\log(cx^n)+\frac{1}{8}bex^8\log(cx^n)$$

input
```
Integrate[x^5*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
(a*d*x^6)/6 - (b*d*n*x^6)/36 + (a*e*x^8)/8 - (b*e*n*x^8)/64 + (b*d*x^6*Log
[c*x^n])/6 + (b*e*x^8*Log[c*x^n])/8
```

3.171.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.02, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5 (d+ex^2) (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{24}(4dx^6+3ex^8)(a+b\log(cx^n)) - bn\int\left(\frac{ex^7}{8}+\frac{dx^5}{6}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{24}(4dx^6+3ex^8)(a+b\log(cx^n)) - bn\left(\frac{dx^6}{36}+\frac{ex^8}{64}\right)$$

input
```
Int[x^5*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d*x^6)/36 + (e*x^8)/64)) + ((4*d*x^6 + 3*e*x^8)*(a + b*Log[c*x^n])
)/24
```

3.171.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.171.4 Maple [A] (verified)

Time = 0.38 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^8 \ln(c\,x^n) b e}{8}-\frac{b e n\,x^8}{64}+\frac{a e\,x^8}{8}+\frac{x^6 \ln(c\,x^n) b d}{6}-\frac{b d n\,x^6}{36}+\frac{a d\,x^6}{6}$
risch	$\frac{b\,x^6 (3 e\,x^2+4 d) \ln(x^n)}{24}-\frac{i\pi b e\,x^8 \operatorname{csgn}(ic) \operatorname{csgn}(ix^n) \operatorname{csgn}(ic\,x^n)}{16}+\frac{i\pi b e\,x^8 \operatorname{csgn}(ic) \operatorname{csgn}(ic\,x^n)^2}{16}+\frac{i\pi b e\,x^8 \operatorname{csgn}(ix^n) \operatorname{csgn}(}{16}$

input
```
int(x^5*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/8*x^8*ln(c*x^n)*b*e-1/64*b*e*n*x^8+1/8*a*e*x^8+1/6*x^6*ln(c*x^n)*b*d-1/3
6*b*d*n*x^6+1/6*a*d*x^6
```

3.171.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^5 (d+ex^2) (a+b\log(cx^n))\,dx = -\frac{1}{64}(ben-8ae)x^8-\frac{1}{36}(bdn-6ad)x^6 + \frac{1}{24}(3bex^8+4bdx^6)\log(c) + \frac{1}{24}(3benx^8+4bdnx^6)\log(x)$$

input
```
integrate(x^5*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/64*(b*e*n - 8*a*e)*x^8 - 1/36*(b*d*n - 6*a*d)*x^6 + 1/24*(3*b*e*x^8 + 4
*b*d*x^6)*log(c) + 1/24*(3*b*e*n*x^8 + 4*b*d*n*x^6)*log(x)
```

3.171.6 Sympy [A] (verification not implemented)

Time = 0.87 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x^5 (d+ex^2) (a+b\log(cx^n))\,dx = \frac{adx^6}{6}+\frac{aex^8}{8}-\frac{bdnx^6}{36}+\frac{bdx^6\log(cx^n)}{6} - \frac{benx^8}{64}+\frac{bex^8\log(cx^n)}{8}$$

input
```
integrate(x**5*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**6/6 + a*e*x**8/8 - b*d*n*x**6/36 + b*d*x**6*log(c*x**n)/6 - b*e*n*x
**8/64 + b*e*x**8*log(c*x**n)/8
```

3.171.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x^5\left(d+ex^2\right)\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{64}\,benx^8+\frac{1}{8}\,bex^8\log\left(cx^n\right)+\frac{1}{8}\,aex^8 - \frac{1}{36}\,bdnx^6+\frac{1}{6}\,bdx^6\log\left(cx^n\right)+\frac{1}{6}\,adx^6$$

input
```
integrate(x^5*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/64*b*e*n*x^8 + 1/8*b*e*x^8*log(c*x^n) + 1/8*a*e*x^8 - 1/36*b*d*n*x^6 +
1/6*b*d*x^6*log(c*x^n) + 1/6*a*d*x^6
```

3.171.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^5\left(d+ex^2\right)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{1}{8}\,benx^8\log\left(x\right)-\frac{1}{64}\,benx^8+\frac{1}{8}\,bex^8\log\left(c\right)+\frac{1}{8}\,aex^8 + \frac{1}{6}\,bdnx^6\log\left(x\right)-\frac{1}{36}\,bdnx^6+\frac{1}{6}\,bdx^6\log\left(c\right)+\frac{1}{6}\,adx^6$$

input
```
integrate(x^5*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/8*b*e*n*x^8*log(x) - 1/64*b*e*n*x^8 + 1/8*b*e*x^8*log(c) + 1/8*a*e*x^8 +
 1/6*b*d*n*x^6*log(x) - 1/36*b*d*n*x^6 + 1/6*b*d*x^6*log(c) + 1/6*a*d*x^6
```

3.171.9 Mupad [B] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x^5(d+ex^2)\,(a+b\log(cx^n))\,dx = \ln(c\,x^n)\,\left(\frac{b\,e\,x^8}{8}+\frac{b\,d\,x^6}{6}\right) + \frac{d\,x^6\,(6\,a-b\,n)}{36}+\frac{e\,x^8\,(8\,a-b\,n)}{64}$$

input
```
int(x^5*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d*x^6)/6 + (b*e*x^8)/8) + (d*x^6*(6*a - b*n))/36 + (e*x^8*(
8*a - b*n))/64
```

3.172 $\int x^3(d+ex^2)(a+b\log(cx^n))\,dx$

3.172.1 Optimal result

Integrand size = 21, antiderivative size = 48

$$\int x^3(d+ex^2)(a+b\log(cx^n))\,dx = -\frac{1}{16}bdnx^4-\frac{1}{36}benx^6+\frac{1}{12}(3dx^4+2ex^6)(a+b\log(cx^n))$$

output
```
-1/16*b*d*n*x^4-1/36*b*e*n*x^6+1/12*(2*e*x^6+3*d*x^4)*(a+b*ln(c*x^n))
```

3.172.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^3(d+ex^2)(a+b\log(cx^n))\,dx = \frac{1}{4}adx^4-\frac{1}{16}bdnx^4+\frac{1}{6}aex^6-\frac{1}{36}benx^6+\frac{1}{4}bdx^4\log(cx^n)+\frac{1}{6}bex^6\log(cx^n)$$

input
```
Integrate[x^3*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
(a*d*x^4)/4 - (b*d*n*x^4)/16 + (a*e*x^6)/6 - (b*e*n*x^6)/36 + (b*d*x^4*Log
[c*x^n])/4 + (b*e*x^6*Log[c*x^n])/6
```

3.172.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.02, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex^2)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{12}(3dx^4+2ex^6)(a+b\log(cx^n))-bn\int\left(\frac{ex^5}{6}+\frac{dx^3}{4}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{12}(3dx^4+2ex^6)(a+b\log(cx^n))-bn\left(\frac{dx^4}{16}+\frac{ex^6}{36}\right)$$

input
```
Int[x^3*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d*x^4)/16 + (e*x^6)/36)) + ((3*d*x^4 + 2*e*x^6)*(a + b*Log[c*x^n])
)/12
```

3.172.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.172.4 Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^6\ln(c\,x^n)be}{6}-\frac{ben\,x^6}{36}+\frac{ae\,x^6}{6}+\frac{x^4\ln(c\,x^n)bd}{4}-\frac{bdn\,x^4}{16}+\frac{ad\,x^4}{4}$
risch	$\frac{b\,x^4(2e\,x^2+3d)\ln(x^n)}{12}-\frac{i\pi be\,x^6\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)}{12}+\frac{i\pi be\,x^6\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2}{12}+\frac{i\pi be\,x^6\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(}{12}$

input
```
int(x^3*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/6*x^6*ln(c*x^n)*b*e-1/36*b*e*n*x^6+1/6*a*e*x^6+1/4*x^4*ln(c*x^n)*b*d-1/1
6*b*d*n*x^4+1/4*a*d*x^4
```

3.172.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^3(d+ex^2)\,(a+b\log(cx^n))\,dx=-\frac{1}{36}\,(ben-6\,ae)x^6-\frac{1}{16}\,(bdn-4\,ad)x^4+\frac{1}{12}\,(2\,bex^6+3\,bdx^4)\log(c)+\frac{1}{12}\,(2\,benx^6+3\,bdnx^4)\log(x)$$

input
```
integrate(x^3*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/36*(b*e*n - 6*a*e)*x^6 - 1/16*(b*d*n - 4*a*d)*x^4 + 1/12*(2*b*e*x^6 + 3
*b*d*x^4)*log(c) + 1/12*(2*b*e*n*x^6 + 3*b*d*n*x^4)*log(x)
```

3.172.6 Sympy [A] (verification not implemented)

Time = 0.46 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x^3(d+ex^2)\,(a+b\log(cx^n))\,dx=\frac{adx^4}{4}+\frac{aex^6}{6}-\frac{bdnx^4}{16}+\frac{bdx^4\log(cx^n)}{4}-\frac{benx^6}{36}+\frac{bex^6\log(cx^n)}{6}$$

input
```
integrate(x**3*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**4/4 + a*e*x**6/6 - b*d*n*x**4/16 + b*d*x**4*log(c*x**n)/4 - b*e*n*x
**6/36 + b*e*x**6*log(c*x**n)/6
```

3.172.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x^3(d+ex^2)(a+b\log(cx^n))\,dx = -\frac{1}{36}benx^6+\frac{1}{6}bex^6\log(cx^n)+\frac{1}{6}aex^6 -\frac{1}{16}bdnx^4+\frac{1}{4}bdx^4\log(cx^n)+\frac{1}{4}adx^4$$

input
```
integrate(x^3*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*e*n*x^6 + 1/6*b*e*x^6*log(c*x^n) + 1/6*a*e*x^6 - 1/16*b*d*n*x^4 +
1/4*b*d*x^4*log(c*x^n) + 1/4*a*d*x^4
```

3.172.8 Giac [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^3(d+ex^2)(a+b\log(cx^n))\,dx = \frac{1}{6}benx^6\log(x)-\frac{1}{36}benx^6+\frac{1}{6}bex^6\log(c)+\frac{1}{6}aex^6 +\frac{1}{4}bdnx^4\log(x)-\frac{1}{16}bdnx^4+\frac{1}{4}bdx^4\log(c)+\frac{1}{4}adx^4$$

input
```
integrate(x^3*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/6*b*e*n*x^6*log(x) - 1/36*b*e*n*x^6 + 1/6*b*e*x^6*log(c) + 1/6*a*e*x^6 +
 1/4*b*d*n*x^4*log(x) - 1/16*b*d*n*x^4 + 1/4*b*d*x^4*log(c) + 1/4*a*d*x^4
```

3.172.9 Mupad [B] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x^3(d+ex^2)\,(a+b\log{(cx^n)})\,\,dx = \ln{(c\,x^n)}\,\left(\frac{b\,e\,x^6}{6}+\frac{b\,d\,x^4}{4}\right) + \frac{d\,x^4\,(4\,a-b\,n)}{16}+\frac{e\,x^6\,(6\,a-b\,n)}{36}$$

input
```
int(x^3*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d*x^4)/4 + (b*e*x^6)/6) + (d*x^4*(4*a - b*n))/16 + (e*x^6*(
6*a - b*n))/36
```

3.173 $\int x(d+ex^2)(a+b\log(cx^n))\,dx$

3.173.1 Optimal result

Integrand size = 19, antiderivative size = 47

$$\int x(d+ex^2)(a+b\log(cx^n))\,dx=-\frac{1}{4}bdnx^2-\frac{1}{16}benx^4+\frac{1}{4}(2dx^2+ex^4)(a+b\log(cx^n))$$

output
```
-1/4*b*d*n*x^2-1/16*b*e*n*x^4+1/4*(e*x^4+2*d*x^2)*(a+b*ln(c*x^n))
```

3.173.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.47

$$\int x(d+ex^2)(a+b\log(cx^n))\,dx=\frac{1}{2}adx^2-\frac{1}{4}bdnx^2+\frac{1}{4}aex^4-\frac{1}{16}benx^4+\frac{1}{2}bdx^2\log(cx^n)+\frac{1}{4}bex^4\log(cx^n)$$

input
```
Integrate[x*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
(a*d*x^2)/2 - (b*d*n*x^2)/4 + (a*e*x^4)/4 - (b*e*n*x^4)/16 + (b*d*x^2*Log[
c*x^n])/2 + (b*e*x^4*Log[c*x^n])/4
```

3.173.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.211, Rules used = {2771, 27, 244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex^2)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{4}(2dx^2+ex^4)(a+b\log(cx^n))-bn\int\frac{1}{4}x(ex^2+2d)\,dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}(2dx^2+ex^4)(a+b\log(cx^n))-\frac{1}{4}bn\int x(ex^2+2d)\,dx$$

$$\Big\downarrow \text{244}$$

$$\frac{1}{4}(2dx^2+ex^4)(a+b\log(cx^n))-\frac{1}{4}bn\int(ex^3+2dx)\,dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}(2dx^2+ex^4)(a+b\log(cx^n))-\frac{1}{4}bn\left(dx^2+\frac{ex^4}{4}\right)$$

input
```
Int[x*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-1/4*(b*n*(d*x^2 + (e*x^4)/4)) + ((2*d*x^2 + e*x^4)*(a + b*Log[c*x^n]))/4
```

3.173.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.173.4 Maple [A] (verified)

Time = 0.17 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.23

method	result	size
parallelrisch	$\frac{x^4 be \ln(c\,x^n)}{4} - \frac{ben\,x^4}{16} + \frac{x^4 ae}{4} + \frac{x^2 \ln(c\,x^n) bd}{2} - \frac{bdn\,x^2}{4} + \frac{ad\,x^2}{2}$	58
risch	Expression too large to display	2346

input
```
int(x*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/4*x^4*b*e*ln(c*x^n)-1/16*b*e*n*x^4+1/4*x^4*a*e+1/2*x^2*ln(c*x^n)*b*d-1/4
*b*d*n*x^2+1/2*a*d*x^2
```

3.173.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 67, normalized size of antiderivative = 1.43

$$\begin{aligned}\int x(d+ex^2)\,(a+b\log{(cx^n)})\;dx =& -\frac{1}{16}\,(ben-4\,ae)x^4-\frac{1}{4}\,(bdn-2\,ad)x^2\\ &+\frac{1}{4}\,(bex^4+2\,bdx^2)\log{(c)}\\ &+\frac{1}{4}\,(benx^4+2\,bdnx^2)\log{(x)}\end{aligned}$$

input
```
integrate(x*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/16*(b*e*n - 4*a*e)*x^4 - 1/4*(b*d*n - 2*a*d)*x^2 + 1/4*(b*e*x^4 + 2*b*d
*x^2)*log(c) + 1/4*(b*e*n*x^4 + 2*b*d*n*x^2)*log(x)
```

3.173.6 Sympy [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.40

$$\int x(d+ex^2)\,(a+b\log(cx^n))\,dx = \frac{adx^2}{2}+\frac{aex^4}{4}-\frac{bdnx^2}{4}+\frac{bdx^2\log(cx^n)}{2} - \frac{benx^4}{16}+\frac{bex^4\log(cx^n)}{4}$$

input
```
integrate(x*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**2/2 + a*e*x**4/4 - b*d*n*x**2/4 + b*d*x**2*log(c*x**n)/2 - b*e*n*x**
*4/16 + b*e*x**4*log(c*x**n)/4
```

3.173.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.21

$$\int x(d+ex^2)\,(a+b\log(cx^n))\,dx = -\frac{1}{16}\,benx^4+\frac{1}{4}\,bex^4\log(cx^n)+\frac{1}{4}\,aex^4 - \frac{1}{4}\,bdnx^2+\frac{1}{2}\,bdx^2\log(cx^n)+\frac{1}{2}\,adx^2$$

input
```
integrate(x*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*e*n*x^4 + 1/4*b*e*x^4*log(c*x^n) + 1/4*a*e*x^4 - 1/4*b*d*n*x^2 + 1
/2*b*d*x^2*log(c*x^n) + 1/2*a*d*x^2
```

3.173.8 Giac [A] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.47

$$\int x(d+ex^2)\,(a+b\log(cx^n))\,dx = \frac{1}{4}\,benx^4\log(x)-\frac{1}{16}\,benx^4+\frac{1}{4}\,bex^4\log(c)+\frac{1}{4}\,aex^4 + \frac{1}{2}\,bdnx^2\log(x)-\frac{1}{4}\,bdnx^2+\frac{1}{2}\,bdx^2\log(c)+\frac{1}{2}\,adx^2$$

input
```
integrate(x*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*b*e*n*x^4*log(x) - 1/16*b*e*n*x^4 + 1/4*b*e*x^4*log(c) + 1/4*a*e*x^4 +
 1/2*b*d*n*x^2*log(x) - 1/4*b*d*n*x^2 + 1/2*b*d*x^2*log(c) + 1/2*a*d*x^2
```

3.173.9 Mupad [B] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.09

$$\int x(d+ex^2)\,(a+b\log(cx^n))\;dx = \ln(c\,x^n)\,\left(\frac{b\,e\,x^4}{4}+\frac{b\,d\,x^2}{2}\right)+\frac{d\,x^2\,(2\,a-b\,n)}{4}+\frac{e\,x^4\,(4\,a-b\,n)}{16}$$

input
```
int(x*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d*x^2)/2 + (b*e*x^4)/4) + (d*x^2*(2*a - b*n))/4 + (e*x^4*(4
*a - b*n))/16
```

3.174 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx$

3.174.1 Optimal result

Integrand size = 21, antiderivative size = 52

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx=-\frac{1}{4}benx^2+\frac{1}{2}ex^2(a+b\log(cx^n))+\frac{d(a+b\log(cx^n))^2}{2bn}$$

output
```
-1/4*b*e*n*x^2+1/2*e*x^2*(a+b*ln(c*x^n))+1/2*d*(a+b*ln(c*x^n))^2/b/n
```

3.174.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx=\frac{1}{2}aex^2-\frac{1}{4}benx^2+ad\log(x)+\frac{1}{2}bex^2\log(cx^n)+\frac{bd\log^2(cx^n)}{2n}$$

input
```
Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(a*e*x^2)/2 - (b*e*n*x^2)/4 + a*d*Log[x] + (b*e*x^2*Log[c*x^n])/2 + (b*d*L
og[c*x^n]^2)/(2*n)
```

3.174.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \text{ 2793}$$

$$\int \left(\frac{d(a+b\log(cx^n))}{x}+ex(a+b\log(cx^n))\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{d(a+b\log(cx^n))^2}{2bn}+\frac{1}{2}ex^2(a+b\log(cx^n))-\frac{1}{4}benx^2$$

input
```
Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
-1/4*(b*e*n*x^2) + (e*x^2*(a + b*Log[c*x^n]))/2 + (d*(a + b*Log[c*x^n])^2)
/(2*b*n)
```

3.174.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.174.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.12

method	result
parallelrisch	$\frac{2x^2\ln(c\,x^n)ben-x^2be\,n^2+2x^2aen+4\ln(x)adn+2bd\ln(c\,x^n)^2}{4n}$
risch	$\left(\frac{be\,x^2}{2}+bd\ln\left(x\right)\right)\ln\left(x^n\right)-\frac{bdn\ln(x)^2}{2}-\frac{i\pi\ \mathrm{csgn}(ic)\ \mathrm{csgn}(ix^n)\ \mathrm{csgn}(ic\,x^n)be\,x^2}{4}+\frac{i\pi\ \mathrm{csgn}(ic)\ \mathrm{csgn}(ic\,x^n)^2be\,x^2}{4}$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/4*(2*x^2*ln(c*x^n)*b*e*n-x^2*b*e*n^2+2*x^2*a*e*n+4*ln(x)*a*d*n+2*b*d*ln(
c*x^n)^2)/n
```

3.174.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.06

$$\int\frac{(d+ex^2)\,(a+b\log{(cx^n)})}{x}\,dx=\frac{1}{2}\,bex^2\log{(c)}+\frac{1}{2}\,bdn\log{(x)}^2-\frac{1}{4}\,(ben-2\,ae)x^2+\frac{1}{2}\left(benx^2+2\,bd\log{(c)}+2\,ad\right)\log{(x)}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*b*e*x^2*log(c) + 1/2*b*d*n*log(x)^2 - 1/4*(b*e*n - 2*a*e)*x^2 + 1/2*(b
*e*n*x^2 + 2*b*d*log(c) + 2*a*d)*log(x)
```

3.174.6 Sympy [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 78, normalized size of antiderivative = 1.50

$$\int\frac{(d+ex^2)\,(a+b\log{(cx^n)})}{x}\,dx=\begin{cases}\frac{ad\log{(cx^n)}}{n}+\frac{aex^2}{2}+\frac{bd\log{(cx^n)}^2}{2n}-\frac{benx^2}{4}+\frac{bex^2\log{(cx^n)}}{2} & \text{for}\ n\neq 0\\ (a+b\log{(c)})\left(d\log{(x)}+\frac{ex^2}{2}\right) & \text{otherwise}\end{cases}$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise((a*d*log(c*x**n)/n + a*e*x**2/2 + b*d*log(c*x**n)**2/(2*n) - b*e
*n*x**2/4 + b*e*x**2*log(c*x**n)/2, Ne(n, 0)), ((a + b*log(c))*(d*log(x) +
 e*x**2/2), True))
```

3.174.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx = -\frac{1}{4}benx^2 + \frac{1}{2}bex^2\log(cx^n) + \frac{1}{2}aex^2 + \frac{bd\log(cx^n)^2}{2n} + ad\log(x)$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
-1/4*b*e*n*x^2 + 1/2*b*e*x^2*log(c*x^n) + 1/2*a*e*x^2 + 1/2*b*d*log(c*x^n)
^2/n + a*d*log(x)
```

3.174.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx = \frac{1}{2}benx^2\log(x) + \frac{1}{2}bdn\log(x)^2 - \frac{1}{4}(ben - 2\,be\log(c) - 2\,ae)x^2 + (bd\log(c) + ad)\log(x)$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
1/2*b*e*n*x^2*log(x) + 1/2*b*d*n*log(x)^2 - 1/4*(b*e*n - 2*b*e*log(c) - 2*
a*e)*x^2 + (b*d*log(c) + a*d)*log(x)
```

3.174.9 Mupad [B] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 48, normalized size of antiderivative = 0.92

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x}\,dx = a\,d\,\ln(x)+\frac{e\,x^2\,(2\,a-b\,n)}{4}+\frac{b\,e\,x^2\,\ln(c\,x^n)}{2}+\frac{b\,d\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((d + e*x^2)*(a + b*log(c*x^n)))/x,x)
```

output
```
a*d*log(x) + (e*x^2*(2*a - b*n))/4 + (b*e*x^2*log(c*x^n))/2 + (b*d*log(c*x
^n)^2)/(2*n)
```

3.175 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx$

3.175.1 Optimal result

Integrand size = 21, antiderivative size = 52

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx = -\frac{bdn}{4x^2} - \frac{d(a+b\log(cx^n))}{2x^2} + \frac{e(a+b\log(cx^n))^2}{2bn}$$

output
```
-1/4*b*d*n/x^2-1/2*d*(a+b*ln(c*x^n))/x^2+1/2*e*(a+b*ln(c*x^n))^2/b/n
```

3.175.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx = -\frac{ad}{2x^2} - \frac{bdn}{4x^2} + ae\log(x) - \frac{bd\log(cx^n)}{2x^2} + \frac{be\log^2(cx^n)}{2n}$$

input
```
Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/2*(a*d)/x^2 - (b*d*n)/(4*x^2) + a*e*Log[x] - (b*d*Log[c*x^n])/(2*x^2) +
 (b*e*Log[c*x^n]^2)/(2*n)
```

3.175.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.06, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int\left(\frac{e\log(x)}{x}-\frac{d}{2x^3}\right)dx-\frac{d(a+b\log(cx^n))}{2x^2}+e\log(x)(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{2x^2}+e\log(x)(a+b\log(cx^n))-bn\left(\frac{d}{4x^2}+\frac{1}{2}e\log^2(x)\right)$$

input
```
Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-(b*n*(d/(4*x^2) + (e*Log[x]^2)/2)) - (d*(a + b*Log[c*x^n]))/(2*x^2) + e*L
og[x]*(a + b*Log[c*x^n])
```

3.175.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.175.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.12

method	result
parallelrisch	$\frac{4\ln(x)x^2aen+2be\ln(c\,x^n)^2x^2-2\ln(c\,x^n)bdn-bd\,n^2-2adn}{4x^2n}$
risch	$-\frac{b(-2e\ln(x)x^2+d)\ln(x^n)}{2x^2}-\frac{2i\ln(x)\pi be\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)x^2-2i\ln(x)\pi be\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2x^2-2i\ln(x)\pi b}{}$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/4/x^2*(4*ln(x)*x^2*a*e*n+2*b*e*ln(c*x^n)^2*x^2-2*ln(c*x^n)*b*d*n-b*d*n^2
-2*a*d*n)/n
```

3.175.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx = \frac{2\,benx^2\log(x)^2-bdn-2\,bd\log(c)-2\,ad+2\,(2\,bex^2\log(c)+2\,aex^2-bdn)\log(x)}{4\,x^2}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
1/4*(2*b*e*n*x^2*log(x)^2 - b*d*n - 2*b*d*log(c) - 2*a*d + 2*(2*b*e*x^2*lo
g(c) + 2*a*e*x^2 - b*d*n)*log(x))/x^2
```

3.175.6 Sympy [A] (verification not implemented)

Time = 1.29 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx = -\frac{ad}{2x^2}+ae\log(x)+bd\left(-\frac{n}{4x^2}-\frac{\log(cx^n)}{2x^2}\right) - be\left(\begin{cases}-\log(c)\log(x) & \text{for } n=0\\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise}\end{cases}\right)$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**3,x)
```

output
```
-a*d/(2*x**2) + a*e*log(x) + b*d*(-n/(4*x**2) - log(c*x**n)/(2*x**2)) - b*
e*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

3.175.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx = \frac{be\log(cx^n)^2}{2n} + ae\log(x) - \frac{bdn}{4x^2} - \frac{bd\log(cx^n)}{2x^2} - \frac{ad}{2x^2}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
1/2*b*e*log(c*x^n)^2/n + a*e*log(x) - 1/4*b*d*n/x^2 - 1/2*b*d*log(c*x^n)/x
^2 - 1/2*a*d/x^2
```

3.175.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx = \frac{1}{2}ben\log(x)^2 - \frac{1}{4}bdn\left(\frac{2\log(x)}{x^2} + \frac{1}{x^2}\right) + be\log(c)\log(|x|) + ae\log(|x|) - \frac{bd\log(c)}{2x^2} - \frac{ad}{2x^2}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
1/2*b*e*n*log(x)^2 - 1/4*b*d*n*(2*log(x)/x^2 + 1/x^2) + b*e*log(c)*log(abs
(x)) + a*e*log(abs(x)) - 1/2*b*d*log(c)/x^2 - 1/2*a*d/x^2
```

3.175.9 Mupad [B] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.27

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^3}\,dx = \ln(x)\left(a\,e+\frac{b\,e\,n}{2}\right)-\frac{\frac{a\,d}{2}+\frac{b\,d\,n}{4}}{x^2}-\frac{\ln(c\,x^n)\,\left(\frac{b\,e\,x^2}{2}+\frac{b\,d}{2}\right)}{x^2}+\frac{b\,e\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((d + e*x^2)*(a + b*log(c*x^n)))/x^3,x)
```

output
```
log(x)*(a*e + (b*e*n)/2) - ((a*d)/2 + (b*d*n)/4)/x^2 - (log(c*x^n)*((b*d)/
2 + (b*e*x^2)/2))/x^2 + (b*e*log(c*x^n)^2)/(2*n)
```

3.176 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx$

3.176.1 Optimal result

Integrand size = 21, antiderivative size = 57

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx=-\frac{bdn}{16x^4}-\frac{ben}{4x^2}-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{e(a+b\log(cx^n))}{2x^2}$$

output
```
-1/16*b*d*n/x^4-1/4*b*e*n/x^2-1/4*d*(a+b*ln(c*x^n))/x^4-1/2*e*(a+b*ln(c*x^
n))/x^2
```

3.176.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx=-\frac{ad}{4x^4}-\frac{bdn}{16x^4}-\frac{ae}{2x^2}-\frac{ben}{4x^2}-\frac{bd\log(cx^n)}{4x^4}-\frac{be\log(cx^n)}{2x^2}$$

input
```
Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
-1/4*(a*d)/x^4 - (b*d*n)/(16*x^4) - (a*e)/(2*x^2) - (b*e*n)/(4*x^2) - (b*d
*Log[c*x^n])/(4*x^4) - (b*e*Log[c*x^n])/(2*x^2)
```

3.176.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.02, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2772, 27, 244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int -\frac{2ex^2+d}{4x^5}dx-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{e(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{4}bn\int \frac{2ex^2+d}{x^5}dx-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{e(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{ 244}$$

$$\frac{1}{4}bn\int \left(\frac{d}{x^5}+\frac{2e}{x^3}\right)dx-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{e(a+b\log(cx^n))}{2x^2}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{e(a+b\log(cx^n))}{2x^2}+\frac{1}{4}bn\left(-\frac{d}{4x^4}-\frac{e}{x^2}\right)$$

input
```
Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-1/4*d/x^4 - e/x^2))/4 - (d*(a + b*Log[c*x^n]))/(4*x^4) - (e*(a + b*
Log[c*x^n]))/(2*x^2)
```

3.176.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.176.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.93

method	result
parallelrisch	$-\frac{8be\,x^{2}\ln\left(c\,x^{n}\right)+4ben\,x^{2}+8ae\,x^{2}+4b\ln\left(c\,x^{n}\right)d+bdn+4ad}{16x^{4}}$
risch	$-\frac{b\left(2e\,x^{2}+d\right)\ln\left(x^{n}\right)}{4x^{4}}-\frac{-4i\pi\ \mathrm{csgn}\left(ic\right)\mathrm{csgn}\left(ix^{n}\right)\mathrm{csgn}\left(ic\,x^{n}\right)be\,x^{2}+4i\pi\ \mathrm{csgn}\left(ic\right)\mathrm{csgn}\left(ic\,x^{n}\right)^{2}be\,x^{2}+4i\pi\ \mathrm{csgn}\left(ix^{n}\right)\mathrm{csgn}\left(ic\,x^{n}\right)}{}$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/16/x^4*(8*b*e*x^2*ln(c*x^n)+4*b*e*n*x^2+8*a*e*x^2+4*b*ln(c*x^n)*d+b*d*n
+4*a*d)
```

3.176.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex^2)\,(a+b\log{(cx^n)})}{x^5}\,dx = -\frac{bdn+4\,(ben+2\,ae)x^2+4\,ad+4\,(2\,bex^2+bd)\log{(c)}+4\,(2\,benx^2+bdn)\log{(x)}}{16\,x^4}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
-1/16*(b*d*n + 4*(b*e*n + 2*a*e)*x^2 + 4*a*d + 4*(2*b*e*x^2 + b*d)*log(c)
+ 4*(2*b*e*n*x^2 + b*d*n)*log(x))/x^4
```

3.176.6 Sympy [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx = -\frac{ad}{4x^4}-\frac{ae}{2x^2}-\frac{bdn}{16x^4}-\frac{bd\log(cx^n)}{4x^4}-\frac{ben}{4x^2}-\frac{be\log(cx^n)}{2x^2}$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**5,x)
```

output
```
-a*d/(4*x**4) - a*e/(2*x**2) - b*d*n/(16*x**4) - b*d*log(c*x**n)/(4*x**4)
- b*e*n/(4*x**2) - b*e*log(c*x**n)/(2*x**2)
```

3.176.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx = -\frac{ben}{4\,x^2}-\frac{be\log(cx^n)}{2\,x^2}-\frac{ae}{2\,x^2}-\frac{bdn}{16\,x^4}-\frac{bd\log(cx^n)}{4\,x^4}-\frac{ad}{4\,x^4}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
-1/4*b*e*n/x^2 - 1/2*b*e*log(c*x^n)/x^2 - 1/2*a*e/x^2 - 1/16*b*d*n/x^4 - 1
/4*b*d*log(c*x^n)/x^4 - 1/4*a*d/x^4
```

3.176.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 65, normalized size of antiderivative = 1.14

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx = -\frac{(2\,benx^2+bdn)\log(x)}{4\,x^4}-\frac{4\,benx^2+8\,bex^2\log(c)+8\,aex^2+bdn+4\,bd\log(c)+4\,ad}{16\,x^4}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
-1/4*(2*b*e*n*x^2 + b*d*n)*log(x)/x^4 - 1/16*(4*b*e*n*x^2 + 8*b*e*x^2*log(
c) + 8*a*e*x^2 + b*d*n + 4*b*d*log(c) + 4*a*d)/x^4
```

3.176.9 Mupad [B] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 51, normalized size of antiderivative = 0.89

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^5}\,dx = -\frac{(2\,a\,e+b\,e\,n)\,x^2+a\,d+\frac{b\,d\,n}{4}}{4\,x^4}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^2}{2}+\frac{b\,d}{4}\right)}{x^4}$$

input
```
int(((d + e*x^2)*(a + b*log(c*x^n)))/x^5,x)
```

output
```
- (a*d + x^2*(2*a*e + b*e*n) + (b*d*n)/4)/(4*x^4) - (log(c*x^n)*((b*d)/4 +
 (b*e*x^2)/2))/x^4
```

3.177 $\int x^4(d+ex^2)(a+b\log(cx^n))\,dx$

3.177.1 Optimal result

Integrand size = 21, antiderivative size = 48

$$\int x^4(d+ex^2)(a+b\log(cx^n))\,dx=-\frac{1}{25}bdnx^5-\frac{1}{49}benx^7+\frac{1}{35}(7dx^5+5ex^7)(a+b\log(cx^n))$$

output
```
-1/25*b*d*n*x^5-1/49*b*e*n*x^7+1/35*(5*e*x^7+7*d*x^5)*(a+b*ln(c*x^n))
```

3.177.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^4(d+ex^2)(a+b\log(cx^n))\,dx=\frac{1}{5}adx^5-\frac{1}{25}bdnx^5+\frac{1}{7}aex^7-\frac{1}{49}benx^7+\frac{1}{5}bdx^5\log(cx^n)+\frac{1}{7}bex^7\log(cx^n)$$

input
```
Integrate[x^4*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
(a*d*x^5)/5 - (b*d*n*x^5)/25 + (a*e*x^7)/7 - (b*e*n*x^7)/49 + (b*d*x^5*Log
[c*x^n])/5 + (b*e*x^7*Log[c*x^n])/7
```

3.177.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.02, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4 (d+ex^2) (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{35}(7dx^5+5ex^7)(a+b\log(cx^n))-bn\int \left(\frac{ex^6}{7}+\frac{dx^4}{5}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{35}(7dx^5+5ex^7)(a+b\log(cx^n))-bn\left(\frac{dx^5}{25}+\frac{ex^7}{49}\right)$$

input
```
Int[x^4*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d*x^5)/25 + (e*x^7)/49)) + ((7*d*x^5 + 5*e*x^7)*(a + b*Log[c*x^n])
)/35
```

3.177.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.177.4 Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^7 be \ln(c\,x^n)}{7} - \frac{ben\,x^7}{49} + \frac{x^7 ae}{7} + \frac{x^5 b \ln(c\,x^n) d}{5} - \frac{bdn\,x^5}{25} + \frac{x^5 ad}{5}$
risch	$\frac{b\,x^5 (5e\,x^2+7d) \ln(x^n)}{35} - \frac{i\pi be\,x^7 \operatorname{csgn}(ic) \operatorname{csgn}(ix^n) \operatorname{csgn}(ic\,x^n)}{14} + \frac{i\pi be\,x^7 \operatorname{csgn}(ic) \operatorname{csgn}(ic\,x^n)^2}{14} + \frac{i\pi be\,x^7 \operatorname{csgn}(ix^n) \operatorname{csgn}(}{14}$

input
```
int(x^4*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/7*x^7*b*e*ln(c*x^n)-1/49*b*e*n*x^7+1/7*x^7*a*e+1/5*x^5*b*ln(c*x^n)*d-1/2
5*b*d*n*x^5+1/5*x^5*a*d
```

3.177.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^4 (d+ex^2) (a+b\log(cx^n))\, dx = -\frac{1}{49}(ben-7\,ae)x^7 - \frac{1}{25}(bdn-5\,ad)x^5 + \frac{1}{35}\left(5\,bex^7+7\,bdx^5\right)\log(c) + \frac{1}{35}\left(5\,benx^7+7\,bdnx^5\right)\log(x)$$

input
```
integrate(x^4*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/49*(b*e*n - 7*a*e)*x^7 - 1/25*(b*d*n - 5*a*d)*x^5 + 1/35*(5*b*e*x^7 + 7
*b*d*x^5)*log(c) + 1/35*(5*b*e*n*x^7 + 7*b*d*n*x^5)*log(x)
```

3.177.6 Sympy [A] (verification not implemented)

Time = 0.68 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x^4 (d+ex^2) (a+b\log(cx^n))\, dx = \frac{adx^5}{5} + \frac{aex^7}{7} - \frac{bdnx^5}{25} + \frac{bdx^5\log(cx^n)}{5} - \frac{benx^7}{49} + \frac{bex^7\log(cx^n)}{7}$$

input
```
integrate(x**4*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**5/5 + a*e*x**7/7 - b*d*n*x**5/25 + b*d*x**5*log(c*x**n)/5 - b*e*n*x
**7/49 + b*e*x**7*log(c*x**n)/7
```

3.177.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x^4(d+ex^2)(a+b\log(cx^n))\,dx = -\frac{1}{49}benx^7+\frac{1}{7}bex^7\log(cx^n)+\frac{1}{7}aex^7 - \frac{1}{25}bdnx^5+\frac{1}{5}bdx^5\log(cx^n)+\frac{1}{5}adx^5$$

input
```
integrate(x^4*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/49*b*e*n*x^7 + 1/7*b*e*x^7*log(c*x^n) + 1/7*a*e*x^7 - 1/25*b*d*n*x^5 +
1/5*b*d*x^5*log(c*x^n) + 1/5*a*d*x^5
```

3.177.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^4(d+ex^2)(a+b\log(cx^n))\,dx = \frac{1}{7}benx^7\log(x)-\frac{1}{49}benx^7+\frac{1}{7}bex^7\log(c)+\frac{1}{7}aex^7 + \frac{1}{5}bdnx^5\log(x)-\frac{1}{25}bdnx^5+\frac{1}{5}bdx^5\log(c)+\frac{1}{5}adx^5$$

input
```
integrate(x^4*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/7*b*e*n*x^7*log(x) - 1/49*b*e*n*x^7 + 1/7*b*e*x^7*log(c) + 1/7*a*e*x^7 +
 1/5*b*d*n*x^5*log(x) - 1/25*b*d*n*x^5 + 1/5*b*d*x^5*log(c) + 1/5*a*d*x^5
```

3.177.9 Mupad [B] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x^4(d+ex^2)\,(a+b\log(cx^n))\,dx = \ln(c\,x^n)\,\left(\frac{b\,e\,x^7}{7}+\frac{b\,d\,x^5}{5}\right) + \frac{d\,x^5\,(5\,a-b\,n)}{25}+\frac{e\,x^7\,(7\,a-b\,n)}{49}$$

input
```
int(x^4*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d*x^5)/5 + (b*e*x^7)/7) + (d*x^5*(5*a - b*n))/25 + (e*x^7*(
7*a - b*n))/49
```

3.178 $\int x^2(d+ex^2)\,(a+b\log{(cx^n)})\;dx$

3.178.1 Optimal result

Integrand size = 21, antiderivative size = 48

$$\int x^2(d+ex^2)\,(a+b\log{(cx^n)})\;dx=-\frac{1}{9}bdnx^3-\frac{1}{25}benx^5+\frac{1}{15}(5dx^3+3ex^5)\,(a+b\log{(cx^n)})$$

output
```
-1/9*b*d*n*x^3-1/25*b*e*n*x^5+1/15*(3*e*x^5+5*d*x^3)*(a+b*ln(c*x^n))
```

3.178.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^2(d+ex^2)\,(a+b\log{(cx^n)})\;dx=\frac{1}{3}adx^3-\frac{1}{9}bdnx^3+\frac{1}{5}aex^5-\frac{1}{25}benx^5+\frac{1}{3}bdx^3\log{(cx^n)}+\frac{1}{5}bex^5\log{(cx^n)}$$

input
```
Integrate[x^2*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
(a*d*x^3)/3 - (b*d*n*x^3)/9 + (a*e*x^5)/5 - (b*e*n*x^5)/25 + (b*d*x^3*Log[
c*x^n])/3 + (b*e*x^5*Log[c*x^n])/5
```

3.178.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.02, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2 \left(d+ex^2\right) (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \text{ 2771}$$

$$\frac{1}{15}\left(5dx^3+3ex^5\right)(a+b\log(cx^n))-bn\int\left(\frac{ex^4}{5}+\frac{dx^2}{3}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{15}\left(5dx^3+3ex^5\right)(a+b\log(cx^n))-bn\left(\frac{dx^3}{9}+\frac{ex^5}{25}\right)$$

input
```
Int[x^2*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d*x^3)/9 + (e*x^5)/25)) + ((5*d*x^3 + 3*e*x^5)*(a + b*Log[c*x^n]))
/15
```

3.178.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.178.4 Maple [A] (verified)

Time = 0.16 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

method	result
parallelrisch	$\frac{x^5 \ln(c x^n) be}{5} - \frac{ben x^5}{25} + \frac{ae x^5}{5} + \frac{x^3 \ln(c x^n) bd}{3} - \frac{bdn x^3}{9} + \frac{x^3 ad}{3}$
risch	$\frac{b x^3 (3e x^2+5d) \ln(x^n)}{15} - \frac{i\pi be x^5 \operatorname{csgn}(ic) \operatorname{csgn}(ix^n) \operatorname{csgn}(ic x^n)}{10} + \frac{i\pi be x^5 \operatorname{csgn}(ic) \operatorname{csgn}(ic x^n)^2}{10} + \frac{i\pi be x^5 \operatorname{csgn}(ix^n) \operatorname{csgn}(}{10}$

input
```
int(x^2*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/5*x^5*ln(c*x^n)*b*e-1/25*b*e*n*x^5+1/5*a*e*x^5+1/3*x^3*ln(c*x^n)*b*d-1/9
*b*d*n*x^3+1/3*x^3*a*d
```

3.178.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^2 (d+ex^2) (a+b\log(cx^n))\, dx = -\frac{1}{25}(ben-5\,ae)x^5 - \frac{1}{9}(bdn-3\,ad)x^3 + \frac{1}{15}\left(3\,bex^5+5\,bdx^3\right)\log(c) + \frac{1}{15}\left(3\,benx^5+5\,bdnx^3\right)\log(x)$$

input
```
integrate(x^2*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/25*(b*e*n - 5*a*e)*x^5 - 1/9*(b*d*n - 3*a*d)*x^3 + 1/15*(3*b*e*x^5 + 5*
b*d*x^3)*log(c) + 1/15*(3*b*e*n*x^5 + 5*b*d*n*x^3)*log(x)
```

3.178.6 Sympy [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 66, normalized size of antiderivative = 1.38

$$\int x^2 (d+ex^2) (a+b\log(cx^n))\, dx = \frac{adx^3}{3} + \frac{aex^5}{5} - \frac{bdnx^3}{9} + \frac{bdx^3\log(cx^n)}{3} - \frac{benx^5}{25} + \frac{bex^5\log(cx^n)}{5}$$

input
```
integrate(x**2*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x**3/3 + a*e*x**5/5 - b*d*n*x**3/9 + b*d*x**3*log(c*x**n)/3 - b*e*n*x**
*5/25 + b*e*x**5*log(c*x**n)/5
```

3.178.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.19

$$\int x^2(d+ex^2)\,(a+b\log(cx^n))\,dx = -\frac{1}{25}\,benx^5+\frac{1}{5}\,bex^5\log(cx^n)+\frac{1}{5}\,aex^5-\frac{1}{9}\,bdnx^3+\frac{1}{3}\,bdx^3\log(cx^n)+\frac{1}{3}\,adx^3$$

input
```
integrate(x^2*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*e*n*x^5 + 1/5*b*e*x^5*log(c*x^n) + 1/5*a*e*x^5 - 1/9*b*d*n*x^3 + 1
/3*b*d*x^3*log(c*x^n) + 1/3*a*d*x^3
```

3.178.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.44

$$\int x^2(d+ex^2)\,(a+b\log(cx^n))\,dx = \frac{1}{5}\,benx^5\log(x)-\frac{1}{25}\,benx^5+\frac{1}{5}\,bex^5\log(c)+\frac{1}{5}\,aex^5+\frac{1}{3}\,bdnx^3\log(x)-\frac{1}{9}\,bdnx^3+\frac{1}{3}\,bdx^3\log(c)+\frac{1}{3}\,adx^3$$

input
```
integrate(x^2*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/5*b*e*n*x^5*log(x) - 1/25*b*e*n*x^5 + 1/5*b*e*x^5*log(c) + 1/5*a*e*x^5 +
 1/3*b*d*n*x^3*log(x) - 1/9*b*d*n*x^3 + 1/3*b*d*x^3*log(c) + 1/3*a*d*x^3
```

3.178.9 Mupad [B] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.06

$$\int x^2(d+ex^2)\,(a+b\log{(cx^n)})\;dx=\ln{(c\,x^n)}\,\left(\frac{b\,e\,x^5}{5}+\frac{b\,d\,x^3}{3}\right)+\frac{d\,x^3\,(3\,a-b\,n)}{9}+\frac{e\,x^5\,(5\,a-b\,n)}{25}$$

input
```
int(x^2*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d*x^3)/3 + (b*e*x^5)/5) + (d*x^3*(3*a - b*n))/9 + (e*x^5*(5
*a - b*n))/25
```

3.179 $\int (d+ex^2)(a+b\log(cx^n))\,dx$

3.179.1 Optimal result

Integrand size = 18, antiderivative size = 48

$$\int (d+ex^2)(a+b\log(cx^n))\,dx=-bdnx-\frac{1}{9}benx^3+dx(a+b\log(cx^n))+\frac{1}{3}ex^3(a+b\log(cx^n))$$

output
```
-b*d*n*x-1/9*b*e*n*x^3+d*x*(a+b*ln(c*x^n))+1/3*e*x^3*(a+b*ln(c*x^n))
```

3.179.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.15

$$\int (d+ex^2)(a+b\log(cx^n))\,dx=adx-bdnx+\frac{1}{3}aex^3-\frac{1}{9}benx^3+bdx\log(cx^n)+\frac{1}{3}bex^3\log(cx^n)$$

input
```
Integrate[(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
a*d*x - b*d*n*x + (a*e*x^3)/3 - (b*e*n*x^3)/9 + b*d*x*Log[c*x^n] + (b*e*x^
3*Log[c*x^n])/3
```

3.179.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2750, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^2)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{ 2750}$$

$$-bn\int \left(\frac{ex^2}{3}+d\right)dx+dx(a+b\log(cx^n))+\frac{1}{3}ex^3(a+b\log(cx^n))$$

$$\Big\downarrow \text{ 2009}$$

$$dx(a+b\log(cx^n))+\frac{1}{3}ex^3(a+b\log(cx^n))-bn\left(dx+\frac{ex^3}{9}\right)$$

input
```
Int[(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*(d*x + (e*x^3)/9)) + d*x*(a + b*Log[c*x^n]) + (e*x^3*(a + b*Log[c*x^
n]))/3
```

3.179.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

3.179.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.04

method	result
parallelrisch	$\frac{x^3 be \ln(c\,x^n)}{3}-\frac{ben\,x^3}{9}+\frac{x^3ae}{3}+x\ln\left(c\,x^n\right)bd-bdnx+xad$
risch	$\frac{bx\left(e\,x^2+3d\right)\ln(x^n)}{3}-\frac{i\pi be\,x^3\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)}{6}+\frac{i\pi be\,x^3\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2}{6}+\frac{i\pi be\,x^3\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/3*x^3*b*e*ln(c*x^n)-1/9*b*e*n*x^3+1/3*x^3*a*e+x*ln(c*x^n)*b*d-b*d*n*x+x*
a*d
```

3.179.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.27

$$\int \left(d+ex^2\right)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{9}\,(ben-3\,ae)x^3-(bdn-ad)x+\frac{1}{3}\left(bex^3+3\,bdx\right)\log\left(c\right)+\frac{1}{3}\left(benx^3+3\,bdnx\right)\log\left(x\right)$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/9*(b*e*n - 3*a*e)*x^3 - (b*d*n - a*d)*x + 1/3*(b*e*x^3 + 3*b*d*x)*log(c
) + 1/3*(b*e*n*x^3 + 3*b*d*n*x)*log(x)
```

3.179.6 Sympy [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.17

$$\int \left(d+ex^2\right)\left(a+b\log\left(cx^n\right)\right)\,dx=adx+\frac{aex^3}{3}-bdnx+bdx\log\left(cx^n\right)-\frac{benx^3}{9}+\frac{bex^3\log\left(cx^n\right)}{3}$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*x + a*e*x**3/3 - b*d*n*x + b*d*x*log(c*x**n) - b*e*n*x**3/9 + b*e*x**3
*log(c*x**n)/3
```

3.179.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.02

$$\int (d+ex^2)(a+b\log(cx^n))\,dx = -\frac{1}{9}benx^3 + \frac{1}{3}bex^3\log(cx^n) + \frac{1}{3}aex^3 - bdnx + bdx\log(cx^n) + adx$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/9*b*e*n*x^3 + 1/3*b*e*x^3*log(c*x^n) + 1/3*a*e*x^3 - b*d*n*x + b*d*x*lo
g(c*x^n) + a*d*x
```

3.179.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.21

$$\int (d+ex^2)(a+b\log(cx^n))\,dx = \frac{1}{3}benx^3\log(x) - \frac{1}{9}benx^3 + \frac{1}{3}bex^3\log(c) + \frac{1}{3}aex^3 + bdnx\log(x) - bdnx + bdx\log(c) + adx$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/3*b*e*n*x^3*log(x) - 1/9*b*e*n*x^3 + 1/3*b*e*x^3*log(c) + 1/3*a*e*x^3 +
b*d*n*x*log(x) - b*d*n*x + b*d*x*log(c) + a*d*x
```

3.179.9 Mupad [B] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.90

$$\int (d+ex^2)(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,e\,x^3}{3} + b\,d\,x\right) + d\,x\,(a-b\,n) + \frac{e\,x^3\,(3\,a-b\,n)}{9}$$

input
```
int((d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*(b*d*x + (b*e*x^3)/3) + d*x*(a - b*n) + (e*x^3*(3*a - b*n))/9
```

3.180 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2} dx$

3.180.1 Optimal result

Integrand size = 21, antiderivative size = 44

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2} dx = -\frac{bdn}{x} - benx - \frac{d(a+b\log(cx^n))}{x} + ex(a+b\log(cx^n))$$

output
```
-b*d*n/x-b*e*n*x-d*(a+b*ln(c*x^n))/x+e*x*(a+b*ln(c*x^n))
```

3.180.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2} dx = -\frac{ad}{x} - \frac{bdn}{x} + aex - benx - \frac{bd\log(cx^n)}{x} + bex\log(cx^n)$$

input
```
Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((a*d)/x) - (b*d*n)/x + a*e*x - b*e*n*x - (b*d*Log[c*x^n])/x + b*e*x*Log[
c*x^n]
```

3.180.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(e-\frac{d}{x^2}\right)dx-\frac{d(a+b\log(cx^n))}{x}+ex(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{x}+ex(a+b\log(cx^n))-bn\left(\frac{d}{x}+ex\right)$$

input
```
Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-(b*n*(d/x + e*x)) - (d*(a + b*Log[c*x^n]))/x + e*x*(a + b*Log[c*x^n])
```

3.180.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.180.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.14

method	result
parallelrisch	$-\frac{-be\,x^{2} \ln\left(c\,x^{n}\right)+ben\,x^{2}-ae\,x^{2}+b\ln\left(c\,x^{n}\right)d+bdn+ad}{x}$
risch	$-\frac{b\left(-e\,x^{2}+d\right)\ln\left(x^{n}\right)}{x}-\frac{i\pi\ \mathrm{csgn}\left(ic\right)\mathrm{csgn}\left(ix^{n}\right)\mathrm{csgn}\left(ic\,x^{n}\right)be\,x^{2}-i\pi\ \mathrm{csgn}\left(ic\right)\mathrm{csgn}\left(ic\,x^{n}\right)^{2}be\,x^{2}-i\pi\ \mathrm{csgn}\left(ix^{n}\right)\mathrm{csgn}\left(ic\,x^{n}\right)^{2}be\,x}{}$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-1/x*(-b*e*x^2*ln(c*x^n)+b*e*n*x^2-a*e*x^2+b*ln(c*x^n)*d+b*d*n+a*d)
```

3.180.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.32

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx$$
$$= -\frac{bdn+(ben-ae)x^2+ad-(bex^2-bd)\log(c)-(benx^2-bdn)\log(x)}{x}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
-(b*d*n + (b*e*n - a*e)*x^2 + a*d - (b*e*x^2 - b*d)*log(c) - (b*e*n*x^2 -
b*d*n)*log(x))/x
```

3.180.6 Sympy [A] (verification not implemented)

Time = 0.17 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx = -\frac{ad}{x}+aex-\frac{bdn}{x}-\frac{bd\log(cx^n)}{x}-benx+bex\log(cx^n)$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**2,x)
```

output
```
-a*d/x + a*e*x - b*d*n/x - b*d*log(c*x**n)/x - b*e*n*x + b*e*x*log(c*x**n)
```

3.180.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx = -benx + bex\log(cx^n) + aex - \frac{bdn}{x} - \frac{bd\log(cx^n)}{x} - \frac{ad}{x}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
-b*e*n*x + b*e*x*log(c*x^n) + a*e*x - b*d*n/x - b*d*log(c*x^n)/x - a*d/x
```

3.180.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx = -(ben - be\log(c) - ae)x + \left(benx - \frac{bdn}{x}\right)\log(x) - \frac{bdn + bd\log(c) + ad}{x}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
-(b*e*n - b*e*log(c) - a*e)*x + (b*e*n*x - b*d*n/x)*log(x) - (b*d*n + b*d*
log(c) + a*d)/x
```

3.180.9 Mupad [B] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.16

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^2}\,dx = e\,x\,(a-b\,n) - \ln(c\,x^n)\left(\frac{b\,e\,x^2+b\,d}{x} - 2\,b\,e\,x\right) - \frac{a\,d+b\,d\,n}{x}$$

input
```
int(((d + e*x^2)*(a + b*log(c*x^n)))/x^2,x)
```

output
```
e*x*(a - b*n) - log(c*x^n)*((b*d + b*e*x^2)/x - 2*b*e*x) - (a*d + b*d*n)/x
```

3.181 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx$

3.181.1 Optimal result

Integrand size = 21, antiderivative size = 53

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx = -\frac{bdn}{9x^3} - \frac{ben}{x} - \frac{d(a+b\log(cx^n))}{3x^3} - \frac{e(a+b\log(cx^n))}{x}$$

output
```
-1/9*b*d*n/x^3-b*e*n/x-1/3*d*(a+b*ln(c*x^n))/x^3-e*(a+b*ln(c*x^n))/x
```

3.181.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx = -\frac{ad}{3x^3} - \frac{bdn}{9x^3} - \frac{ae}{x} - \frac{ben}{x} - \frac{bd\log(cx^n)}{3x^3} - \frac{be\log(cx^n)}{x}$$

input
```
Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/3*(a*d)/x^3 - (b*d*n)/(9*x^3) - (a*e)/x - (b*e*n)/x - (b*d*Log[c*x^n])/
(3*x^3) - (b*e*Log[c*x^n])/x
```

3.181.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.06, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2772, 27, 244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{3ex^2+d}{3x^4}dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}bn\int \frac{3ex^2+d}{x^4}dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{244}$$

$$\frac{1}{3}bn\int \left(\frac{d}{x^4}+\frac{3e}{x^2}\right)dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{e(a+b\log(cx^n))}{x}+\frac{1}{3}bn\left(-\frac{d}{3x^3}-\frac{3e}{x}\right)$$

input
```
Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-1/3*d/x^3 - (3*e)/x))/3 - (d*(a + b*Log[c*x^n]))/(3*x^3) - (e*(a +
b*Log[c*x^n]))/x
```

3.181.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.181.4 Maple [A] (verified)

Time = 0.07 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.00

method	result
parallelrisch	$-\frac{9be\,x^2\ln(c\,x^n)+9ben\,x^2+9ae\,x^2+3b\ln(c\,x^n)d+bdn+3ad}{9x^3}$
risch	$-\frac{b(3e\,x^2+d)\ln(x^n)}{3x^3}-\frac{-9i\pi\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)be\,x^2+9i\pi\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2be\,x^2+9i\pi\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)}{}$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/9/x^3*(9*b*e*x^2*ln(c*x^n)+9*b*e*n*x^2+9*a*e*x^2+3*b*ln(c*x^n)*d+b*d*n+
3*a*d)
```

3.181.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx = -\frac{bdn+9\,(ben+ae)x^2+3\,ad+3\,(3\,bex^2+bd)\log(c)+3\,(3\,benx^2+bdn)\log(x)}{9\,x^3}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/9*(b*d*n + 9*(b*e*n + a*e)*x^2 + 3*a*d + 3*(3*b*e*x^2 + b*d)*log(c) + 3
*(3*b*e*n*x^2 + b*d*n)*log(x))/x^3
```

3.181.6 Sympy [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.09

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx = -\frac{ad}{3x^3}-\frac{ae}{x}-\frac{bdn}{9x^3}-\frac{bd\log(cx^n)}{3x^3}-\frac{ben}{x}-\frac{be\log(cx^n)}{x}$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d/(3*x**3) - a*e/x - b*d*n/(9*x**3) - b*d*log(c*x**n)/(3*x**3) - b*e*n/
x - b*e*log(c*x**n)/x
```

3.181.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx = -\frac{ben}{x}-\frac{be\log(cx^n)}{x}-\frac{ae}{x}-\frac{bdn}{9\,x^3}-\frac{bd\log(cx^n)}{3\,x^3}-\frac{ad}{3\,x^3}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
-b*e*n/x - b*e*log(c*x^n)/x - a*e/x - 1/9*b*d*n/x^3 - 1/3*b*d*log(c*x^n)/x
^3 - 1/3*a*d/x^3
```

3.181.8 Giac [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 65, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx = -\frac{(3\,benx^2+bdn)\log(x)}{3\,x^3}-\frac{9\,benx^2+9\,bex^2\log(c)+9\,aex^2+bdn+3\,bd\log(c)+3\,ad}{9\,x^3}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
-1/3*(3*b*e*n*x^2 + b*d*n)*log(x)/x^3 - 1/9*(9*b*e*n*x^2 + 9*b*e*x^2*log(c
) + 9*a*e*x^2 + b*d*n + 3*b*d*log(c) + 3*a*d)/x^3
```

3.181.9 Mupad [B] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 51, normalized size of antiderivative = 0.96

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^4}\,dx = -\frac{(3\,a\,e+3\,b\,e\,n)\ x^2+a\,d+\frac{b\,d\,n}{3}}{3\,x^3}-\frac{\ln\left(c\,x^n\right)\ \left(b\,e\,x^2+\frac{b\,d}{3}\right)}{x^3}$$

input
```
int(((d + e*x^2)*(a + b*log(c*x^n)))/x^4,x)
```

output
```
- (a*d + x^2*(3*a*e + 3*b*e*n) + (b*d*n)/3)/(3*x^3) - (log(c*x^n)*((b*d)/3
 + b*e*x^2))/x^3
```

3.182 $\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx$

3.182.1 Optimal result

Integrand size = 21, antiderivative size = 57

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx = -\frac{bdn}{25x^5} - \frac{ben}{9x^3} - \frac{d(a+b\log(cx^n))}{5x^5} - \frac{e(a+b\log(cx^n))}{3x^3}$$

output
```
-1/25*b*d*n/x^5-1/9*b*e*n/x^3-1/5*d*(a+b*ln(c*x^n))/x^5-1/3*e*(a+b*ln(c*x^
n))/x^3
```

3.182.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx = -\frac{ad}{5x^5} - \frac{bdn}{25x^5} - \frac{ae}{3x^3} - \frac{ben}{9x^3} - \frac{bd\log(cx^n)}{5x^5} - \frac{be\log(cx^n)}{3x^3}$$

input
```
Integrate[((d + e*x^2)*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/5*(a*d)/x^5 - (b*d*n)/(25*x^5) - (a*e)/(3*x^3) - (b*e*n)/(9*x^3) - (b*d
*Log[c*x^n])/(5*x^5) - (b*e*Log[c*x^n])/(3*x^3)
```

3.182.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2772, 27, 244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}dx$$

$$\Big\downarrow \; 2772$$

$$-bn\int -\frac{5ex^2+3d}{15x^6}dx-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{e(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \; 27$$

$$\frac{1}{15}bn\int \frac{5ex^2+3d}{x^6}dx-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{e(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \; 244$$

$$\frac{1}{15}bn\int \left(\frac{3d}{x^6}+\frac{5e}{x^4}\right)dx-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{e(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \; 2009$$

$$-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{e(a+b\log(cx^n))}{3x^3}+\frac{1}{15}bn\left(-\frac{3d}{5x^5}-\frac{5e}{3x^3}\right)$$

input
```
Int[((d + e*x^2)*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*((-3*d)/(5*x^5) - (5*e)/(3*x^3)))/15 - (d*(a + b*Log[c*x^n]))/(5*x^5)
 - (e*(a + b*Log[c*x^n]))/(3*x^3)
```

3.182.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.182.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 54, normalized size of antiderivative = 0.95

method	result
parallelrisch	$-\frac{75be\,x^2\ln(c\,x^n)+25ben\,x^2+75ae\,x^2+45b\ln(c\,x^n)d+9bdn+45ad}{225x^5}$
risch	$-\frac{b(5e\,x^2+3d)\ln(x^n)}{15x^5}-\frac{-75i\pi\ \mathrm{csgn}(ic)\ \mathrm{csgn}(ix^n)\ \mathrm{csgn}(ic\,x^n)be\,x^2+75i\pi\ \mathrm{csgn}(ic)\ \mathrm{csgn}(ic\,x^n)^2be\,x^2+75i\pi\ \mathrm{csgn}(ix^n)\ \mathrm{csgn}(i}{}$

input
```
int((e*x^2+d)*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/225/x^5*(75*b*e*x^2*ln(c*x^n)+25*b*e*n*x^2+75*a*e*x^2+45*b*ln(c*x^n)*d+
9*b*d*n+45*a*d)
```

3.182.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^2)\,(a+b\log{(cx^n)})}{x^6}\,dx = -\frac{9\,bdn+25\,(ben+3\,ae)x^2+45\,ad+15\,(5\,bex^2+3\,bd)\log{(c)}+15\,(5\,benx^2+3\,bdn)\log{(x)}}{225\,x^5}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/225*(9*b*d*n + 25*(b*e*n + 3*a*e)*x^2 + 45*a*d + 15*(5*b*e*x^2 + 3*b*d)
*log(c) + 15*(5*b*e*n*x^2 + 3*b*d*n)*log(x))/x^5
```

3.182.6 Sympy [A] (verification not implemented)

Time = 0.52 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx = -\frac{ad}{5x^5} - \frac{ae}{3x^3} - \frac{bdn}{25x^5} - \frac{bd\log(cx^n)}{5x^5} - \frac{ben}{9x^3} - \frac{be\log(cx^n)}{3x^3}$$

input
```
integrate((e*x**2+d)*(a+b*ln(c*x**n))/x**6,x)
```

output
```
-a*d/(5*x**5) - a*e/(3*x**3) - b*d*n/(25*x**5) - b*d*log(c*x**n)/(5*x**5)
- b*e*n/(9*x**3) - b*e*log(c*x**n)/(3*x**3)
```

3.182.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx = -\frac{ben}{9\,x^3} - \frac{be\log(cx^n)}{3\,x^3} - \frac{ae}{3\,x^3} - \frac{bdn}{25\,x^5} - \frac{bd\log(cx^n)}{5\,x^5} - \frac{ad}{5\,x^5}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
-1/9*b*e*n/x^3 - 1/3*b*e*log(c*x^n)/x^3 - 1/3*a*e/x^3 - 1/25*b*d*n/x^5 - 1
/5*b*d*log(c*x^n)/x^5 - 1/5*a*d/x^5
```

3.182.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 67, normalized size of antiderivative = 1.18

$$\begin{aligned}\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx \\ &= -\frac{(5\,benx^2+3\,bdn)\log(x)}{15\,x^5} \\ &\quad -\frac{25\,benx^2+75\,bex^2\log(c)+75\,aex^2+9\,bdn+45\,bd\log(c)+45\,ad}{225\,x^5}\end{aligned}$$

input
```
integrate((e*x^2+d)*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
-1/15*(5*b*e*n*x^2 + 3*b*d*n)*log(x)/x^5 - 1/225*(25*b*e*n*x^2 + 75*b*e*x^
2*log(c) + 75*a*e*x^2 + 9*b*d*n + 45*b*d*log(c) + 45*a*d)/x^5
```

3.182.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.93

$$\int \frac{(d+ex^2)(a+b\log(cx^n))}{x^6}\,dx = -\frac{\left(5\,a\,e+\frac{5\,b\,e\,n}{3}\right)\,x^2+3\,a\,d+\frac{3\,b\,d\,n}{5}}{15\,x^5}-\frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,e\,x^2}{3}+\frac{b\,d}{5}\right)}{x^5}$$

input
```
int(((d + e*x^2)*(a + b*log(c*x^n)))/x^6,x)
```

output
```
- (3*a*d + x^2*(5*a*e + (5*b*e*n)/3) + (3*b*d*n)/5)/(15*x^5) - (log(c*x^n)
*((b*d)/5 + (b*e*x^2)/3))/x^5
```

3.183 $\int x^5 (d+ex^2)^2 (a+b\log(cx^n))\,dx$

3.183.1 Optimal result

Integrand size = 23, antiderivative size = 74

$$\int x^5 (d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{36}bd^2nx^6 - \frac{1}{32}bdenx^8 - \frac{1}{100}be^2nx^{10} + \frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)(a+b\log(cx^n))$$

output
```
-1/36*b*d^2*n*x^6-1/32*b*d*e*n*x^8-1/100*b*e^2*n*x^10+1/60*(6*e^2*x^10+15*
d*e*x^8+10*d^2*x^6)*(a+b*ln(c*x^n))
```

3.183.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 84, normalized size of antiderivative = 1.14

$$\int x^5 (d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{x^6(-200bd^2n-225bdenx^2-72be^2nx^4+1200d^2(a+b\log(cx^n))+1800dex^2(a+b\log(cx^n))+720e^2x^4(}{7200}$$

input
```
Integrate[x^5*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^6*(-200*b*d^2*n - 225*b*d*e*n*x^2 - 72*b*e^2*n*x^4 + 1200*d^2*(a + b*Lo
g[c*x^n]) + 1800*d*e*x^2*(a + b*Log[c*x^n]) + 720*e^2*x^4*(a + b*Log[c*x^n
])))/7200
```

3.183.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2771, 27, 1433, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5\left(d+ex^2\right)^2(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)(a+b\log(cx^n))-bn\int\frac{1}{60}x^5\left(6e^2x^4+15dex^2+10d^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)(a+b\log(cx^n))-\frac{1}{60}bn\int x^5\left(6e^2x^4+15dex^2+10d^2\right)dx$$

$$\Big\downarrow \text{1433}$$

$$\frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)(a+b\log(cx^n))-\frac{1}{60}bn\int\left(6e^2x^9+15dex^7+10d^2x^5\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{60}\left(10d^2x^6+15dex^8+6e^2x^{10}\right)(a+b\log(cx^n))-\frac{1}{60}bn\left(\frac{5d^2x^6}{3}+\frac{15}{8}dex^8+\frac{3e^2x^{10}}{5}\right)$$

input
```
Int[x^5*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/60*(b*n*((5*d^2*x^6)/3 + (15*d*e*x^8)/8 + (3*e^2*x^10)/5)) + ((10*d^2*x
^6 + 15*d*e*x^8 + 6*e^2*x^10)*(a + b*Log[c*x^n]))/60
```

3.183.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1433
```
Int[((d_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol]
 :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a,
b, c, d, m}, x] && IGtQ[p, 0] && (EqQ[p, 1] ||  !IntegerQ[(m + 1)/2])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.183.4 Maple [A] (verified)

Time = 1.37 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^{10}\ln(c\,x^n)b\,e^2}{10}-\frac{b\,e^2 n\,x^{10}}{100}+\frac{a\,e^2x^{10}}{10}+\frac{x^8\ln(c\,x^n)bde}{4}-\frac{bden\,x^8}{32}+\frac{ade\,x^8}{4}+\frac{x^6\ln(c\,x^n)b\,d^2}{6}-\frac{b\,d^2n\,x^6}{36}+\frac{a\,d^2x}{6}$
risch	$\frac{b\,x^6(6e^2x^4+15de\,x^2+10d^2)\ln(x^n)}{60}-\frac{i\pi bde\,x^8\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)}{8}+\frac{i\pi bde\,x^8\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2}{8}+\frac{i\pi b\,d^2}{}$

input
```
int(x^5*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/10*x^10*ln(c*x^n)*b*e^2-1/100*b*e^2*n*x^10+1/10*a*e^2*x^10+1/4*x^8*ln(c*
x^n)*b*d*e-1/32*b*d*e*n*x^8+1/4*a*d*e*x^8+1/6*x^6*ln(c*x^n)*b*d^2-1/36*b*d
^2*n*x^6+1/6*a*d^2*x^6
```

3.183.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\begin{aligned}\int x^5\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx=&-\frac{1}{100}\left(be^2n-10\,ae^2\right)x^{10}\\&-\frac{1}{32}\left(bden-8\,ade\right)x^8-\frac{1}{36}\left(bd^2n-6\,ad^2\right)x^6\\&+\frac{1}{60}\left(6\,be^2x^{10}+15\,bdex^8+10\,bd^2x^6\right)\log\left(c\right)\\&+\frac{1}{60}\left(6\,be^2nx^{10}+15\,bdenx^8+10\,bd^2nx^6\right)\log\left(x\right)\end{aligned}$$

input
```
integrate(x^5*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/100*(b*e^2*n - 10*a*e^2)*x^10 - 1/32*(b*d*e*n - 8*a*d*e)*x^8 - 1/36*(b*
d^2*n - 6*a*d^2)*x^6 + 1/60*(6*b*e^2*x^10 + 15*b*d*e*x^8 + 10*b*d^2*x^6)*l
og(c) + 1/60*(6*b*e^2*n*x^10 + 15*b*d*e*n*x^8 + 10*b*d^2*n*x^6)*log(x)
```

3.183.6 Sympy [A] (verification not implemented)

Time = 1.69 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.57

$$\int x^5(d+ex^2)^2(a+b\log(cx^n))\,dx = \frac{ad^2x^6}{6}+\frac{adex^8}{4}+\frac{ae^2x^{10}}{10}-\frac{bd^2nx^6}{36}+\frac{bd^2x^6\log(cx^n)}{6}-\frac{bdenx^8}{32}+\frac{bdex^8\log(cx^n)}{4}-\frac{be^2nx^{10}}{100}+\frac{be^2x^{10}\log(cx^n)}{10}$$

input
```
integrate(x**5*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**6/6 + a*d*e*x**8/4 + a*e**2*x**10/10 - b*d**2*n*x**6/36 + b*d**2
*x**6*log(c*x**n)/6 - b*d*e*n*x**8/32 + b*d*e*x**8*log(c*x**n)/4 - b*e**2*
n*x**10/100 + b*e**2*x**10*log(c*x**n)/10
```

3.183.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x^5(d+ex^2)^2(a+b\log(cx^n))\,dx = -\frac{1}{100}be^2nx^{10}+\frac{1}{10}be^2x^{10}\log(cx^n)+\frac{1}{10}ae^2x^{10}-\frac{1}{32}bdenx^8+\frac{1}{4}bdex^8\log(cx^n)+\frac{1}{4}adex^8-\frac{1}{36}bd^2nx^6+\frac{1}{6}bd^2x^6\log(cx^n)+\frac{1}{6}ad^2x^6$$

input
```
integrate(x^5*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/100*b*e^2*n*x^10 + 1/10*b*e^2*x^10*log(c*x^n) + 1/10*a*e^2*x^10 - 1/32*
b*d*e*n*x^8 + 1/4*b*d*e*x^8*log(c*x^n) + 1/4*a*d*e*x^8 - 1/36*b*d^2*n*x^6
+ 1/6*b*d^2*x^6*log(c*x^n) + 1/6*a*d^2*x^6
```

3.183.8 Giac [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x^5(d+ex^2)^2(a+b\log(cx^n))\,dx = \frac{1}{10}be^2nx^{10}\log(x) - \frac{1}{100}be^2nx^{10} + \frac{1}{10}be^2x^{10}\log(c) + \frac{1}{10}ae^2x^{10} + \frac{1}{4}bdenx^8\log(x) - \frac{1}{32}bdenx^8 + \frac{1}{4}bdex^8\log(c) + \frac{1}{4}adex^8 + \frac{1}{6}bd^2nx^6\log(x) - \frac{1}{36}bd^2nx^6 + \frac{1}{6}bd^2x^6\log(c) + \frac{1}{6}ad^2x^6$$

input
```
integrate(x^5*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/10*b*e^2*n*x^10*log(x) - 1/100*b*e^2*n*x^10 + 1/10*b*e^2*x^10*log(c) + 1
/10*a*e^2*x^10 + 1/4*b*d*e*n*x^8*log(x) - 1/32*b*d*e*n*x^8 + 1/4*b*d*e*x^8
*log(c) + 1/4*a*d*e*x^8 + 1/6*b*d^2*n*x^6*log(x) - 1/36*b*d^2*n*x^6 + 1/6*
b*d^2*x^6*log(c) + 1/6*a*d^2*x^6
```

3.183.9 Mupad [B] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x^5(d+ex^2)^2(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^2\,x^6}{6} + \frac{b\,d\,e\,x^8}{4} + \frac{b\,e^2\,x^{10}}{10}\right) + \frac{d^2\,x^6\,(6\,a-b\,n)}{36} + \frac{e^2\,x^{10}\,(10\,a-b\,n)}{100} + \frac{d\,e\,x^8\,(8\,a-b\,n)}{32}$$

input
```
int(x^5*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^2*x^6)/6 + (b*e^2*x^10)/10 + (b*d*e*x^8)/4) + (d^2*x^6*(6
*a - b*n))/36 + (e^2*x^10*(10*a - b*n))/100 + (d*e*x^8*(8*a - b*n))/32
```

3.184 $\int x^3(d+ex^2)^2\,(a+b\log(cx^n))\,dx$

3.184.1 Optimal result

Integrand size = 23, antiderivative size = 74

$$\int x^3(d+ex^2)^2\,(a+b\log(cx^n))\,dx = -\frac{1}{16}bd^2nx^4-\frac{1}{18}bdenx^6-\frac{1}{64}be^2nx^8 + \frac{1}{24}(6d^2x^4+8dex^6+3e^2x^8)\,(a+b\log(cx^n))$$

output
```
-1/16*b*d^2*n*x^4-1/18*b*d*e*n*x^6-1/64*b*e^2*n*x^8+1/24*(3*e^2*x^8+8*d*e*
x^6+6*d^2*x^4)*(a+b*ln(c*x^n))
```

3.184.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 87, normalized size of antiderivative = 1.18

$$\int x^3(d+ex^2)^2\,(a+b\log(cx^n))\,dx = \frac{1}{576}x^4\big(24a(6d^2+8dex^2+3e^2x^4) - bn(36d^2+32dex^2+9e^2x^4) + 24b(6d^2+8dex^2+3e^2x^4)\log(cx^n)\big)$$

input
```
Integrate[x^3*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(24*a*(6*d^2 + 8*d*e*x^2 + 3*e^2*x^4) - b*n*(36*d^2 + 32*d*e*x^2 + 9*
e^2*x^4) + 24*b*(6*d^2 + 8*d*e*x^2 + 3*e^2*x^4)*Log[c*x^n]))/576
```

3.184.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2771, 27, 1433, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)\left(a+b\log\left(cx^n\right)\right)-bn\int \frac{1}{24}x^3\left(3e^2x^4+8dex^2+6d^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{24}bn\int x^3\left(3e^2x^4+8dex^2+6d^2\right)dx$$

$$\Big\downarrow \text{1433}$$

$$\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{24}bn\int \left(3e^2x^7+8dex^5+6d^2x^3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{24}\left(6d^2x^4+8dex^6+3e^2x^8\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{24}bn\left(\frac{3d^2x^4}{2}+\frac{4}{3}dex^6+\frac{3e^2x^8}{8}\right)$$

input
```
Int[x^3*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/24*(b*n*((3*d^2*x^4)/2 + (4*d*e*x^6)/3 + (3*e^2*x^8)/8)) + ((6*d^2*x^4
+ 8*d*e*x^6 + 3*e^2*x^8)*(a + b*Log[c*x^n]))/24
```

3.184.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1433
```
Int[((d_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol]
 :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a,
b, c, d, m}, x] && IGtQ[p, 0] && (EqQ[p, 1] ||  !IntegerQ[(m + 1)/2])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.184.4 Maple [A] (verified)

Time = 0.79 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^8 \ln(c\,x^n) b\,e^2}{8}-\frac{b\,e^2 n\,x^8}{64}+\frac{a\,e^2 x^8}{8}+\frac{x^6 \ln(c\,x^n) bde}{3}-\frac{bden\,x^6}{18}+\frac{ade\,x^6}{3}+\frac{x^4 \ln(c\,x^n) b\,d^2}{4}-\frac{b\,d^2 n\,x^4}{16}+\frac{a\,d^2 x^4}{4}$
risch	$\frac{b\,x^4 (3e^2 x^4+8de\,x^2+6d^2) \ln(x^n)}{24}+\frac{i\pi b\,d^2 x^4 \operatorname{csgn}(ic) \operatorname{csgn}(ic\,x^n)^2}{8}-\frac{i\pi bde\,x^6 \operatorname{csgn}(ic) \operatorname{csgn}(ix^n) \operatorname{csgn}(ic\,x^n)}{6}+\frac{i\pi b\,e^2 x^8 \text{cs}}{}$

input
```
int(x^3*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/8*x^8*ln(c*x^n)*b*e^2-1/64*b*e^2*n*x^8+1/8*a*e^2*x^8+1/3*x^6*ln(c*x^n)*b
*d*e-1/18*b*d*e*n*x^6+1/3*a*d*e*x^6+1/4*x^4*ln(c*x^n)*b*d^2-1/16*b*d^2*n*x
^4+1/4*a*d^2*x^4
```

3.184.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\begin{aligned}\int x^3\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx = & -\frac{1}{64}\left(be^2n-8\,ae^2\right)x^8-\frac{1}{18}\left(bden-6\,ade\right)x^6 \\ & -\frac{1}{16}\left(bd^2n-4\,ad^2\right)x^4 \\ & +\frac{1}{24}\left(3\,be^2x^8+8\,bdex^6+6\,bd^2x^4\right)\log\left(c\right) \\ & +\frac{1}{24}\left(3\,be^2nx^8+8\,bdenx^6+6\,bd^2nx^4\right)\log\left(x\right)\end{aligned}$$

input
```
integrate(x^3*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/64*(b*e^2*n - 8*a*e^2)*x^8 - 1/18*(b*d*e*n - 6*a*d*e)*x^6 - 1/16*(b*d^2
*n - 4*a*d^2)*x^4 + 1/24*(3*b*e^2*x^8 + 8*b*d*e*x^6 + 6*b*d^2*x^4)*log(c)
+ 1/24*(3*b*e^2*n*x^8 + 8*b*d*e*n*x^6 + 6*b*d^2*n*x^4)*log(x)
```

3.184.6 Sympy [A] (verification not implemented)

Time = 0.87 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.57

$$\int x^3(d+ex^2)^2(a+b\log(cx^n))\,dx = \frac{ad^2x^4}{4}+\frac{adex^6}{3}+\frac{ae^2x^8}{8}-\frac{bd^2nx^4}{16}+\frac{bd^2x^4\log(cx^n)}{4}-\frac{bdenx^6}{18}+\frac{bdex^6\log(cx^n)}{3}-\frac{be^2nx^8}{64}+\frac{be^2x^8\log(cx^n)}{8}$$

input
```
integrate(x**3*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**4/4 + a*d*e*x**6/3 + a*e**2*x**8/8 - b*d**2*n*x**4/16 + b*d**2*x
**4*log(c*x**n)/4 - b*d*e*n*x**6/18 + b*d*e*x**6*log(c*x**n)/3 - b*e**2*n*
x**8/64 + b*e**2*x**8*log(c*x**n)/8
```

3.184.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x^3(d+ex^2)^2(a+b\log(cx^n))\,dx = -\frac{1}{64}be^2nx^8+\frac{1}{8}be^2x^8\log(cx^n)+\frac{1}{8}ae^2x^8-\frac{1}{18}bdenx^6+\frac{1}{3}bdex^6\log(cx^n)+\frac{1}{3}adex^6-\frac{1}{16}bd^2nx^4+\frac{1}{4}bd^2x^4\log(cx^n)+\frac{1}{4}ad^2x^4$$

input
```
integrate(x^3*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/64*b*e^2*n*x^8 + 1/8*b*e^2*x^8*log(c*x^n) + 1/8*a*e^2*x^8 - 1/18*b*d*e*
n*x^6 + 1/3*b*d*e*x^6*log(c*x^n) + 1/3*a*d*e*x^6 - 1/16*b*d^2*n*x^4 + 1/4*
b*d^2*x^4*log(c*x^n) + 1/4*a*d^2*x^4
```

3.184.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x^3 (d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{1}{8}\,be^2nx^8\log(x) - \frac{1}{64}\,be^2nx^8 + \frac{1}{8}\,be^2x^8\log(c) + \frac{1}{8}\,ae^2x^8 + \frac{1}{3}\,bdenx^6\log(x) - \frac{1}{18}\,bdenx^6 + \frac{1}{3}\,bdex^6\log(c) + \frac{1}{3}\,adex^6 + \frac{1}{4}\,bd^2nx^4\log(x) - \frac{1}{16}\,bd^2nx^4 + \frac{1}{4}\,bd^2x^4\log(c) + \frac{1}{4}\,ad^2x^4$$

input
```
integrate(x^3*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/8*b*e^2*n*x^8*log(x) - 1/64*b*e^2*n*x^8 + 1/8*b*e^2*x^8*log(c) + 1/8*a*e
^2*x^8 + 1/3*b*d*e*n*x^6*log(x) - 1/18*b*d*e*n*x^6 + 1/3*b*d*e*x^6*log(c)
+ 1/3*a*d*e*x^6 + 1/4*b*d^2*n*x^4*log(x) - 1/16*b*d^2*n*x^4 + 1/4*b*d^2*x^
4*log(c) + 1/4*a*d^2*x^4
```

3.184.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x^3 (d+ex^2)^2 (a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^2\,x^4}{4} + \frac{b\,d\,e\,x^6}{3} + \frac{b\,e^2\,x^8}{8}\right) + \frac{d^2\,x^4\,(4\,a-b\,n)}{16} + \frac{e^2\,x^8\,(8\,a-b\,n)}{64} + \frac{d\,e\,x^6\,(6\,a-b\,n)}{18}$$

input
```
int(x^3*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^2*x^4)/4 + (b*e^2*x^8)/8 + (b*d*e*x^6)/3) + (d^2*x^4*(4*a
 - b*n))/16 + (e^2*x^8*(8*a - b*n))/64 + (d*e*x^6*(6*a - b*n))/18
```

3.185 $\int x(d+ex^2)^2 (a+b\log(cx^n))\, dx$

3.185.1 Optimal result

Integrand size = 21, antiderivative size = 76

$$\int x(d+ex^2)^2 (a+b\log(cx^n))\, dx = -\frac{1}{4}bd^2nx^2 - \frac{1}{8}bdenx^4 - \frac{1}{36}be^2nx^6 - \frac{bd^3n\log(x)}{6e} + \frac{(d+ex^2)^3 (a+b\log(cx^n))}{6e}$$

output
```
-1/4*b*d^2*n*x^2-1/8*b*d*e*n*x^4-1/36*b*e^2*n*x^6-1/6*b*d^3*n*ln(x)/e+1/6*
(e*x^2+d)^3*(a+b*ln(c*x^n))/e
```

3.185.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 85, normalized size of antiderivative = 1.12

$$\int x(d+ex^2)^2 (a+b\log(cx^n))\, dx = \frac{1}{72}x^2\left(12a(3d^2+3dex^2+e^2x^4) - bn(18d^2+9dex^2+2e^2x^4) + 12b(3d^2+3dex^2+e^2x^4)\log(cx^n)\right)$$

input
```
Integrate[x*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(12*a*(3*d^2 + 3*d*e*x^2 + e^2*x^4) - b*n*(18*d^2 + 9*d*e*x^2 + 2*e^2
*x^4) + 12*b*(3*d^2 + 3*d*e*x^2 + e^2*x^4)*Log[c*x^n]))/72
```

3.185.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 75, normalized size of antiderivative = 0.99, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {2771, 27, 243, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex^2)^2(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{ 2771}$$

$$\frac{(d+ex^2)^3(a+b\log(cx^n))}{6e}-bn\int\frac{(ex^2+d)^3}{6ex}dx$$

$$\Big\downarrow \text{ 27}$$

$$\frac{(d+ex^2)^3(a+b\log(cx^n))}{6e}-\frac{bn\int\frac{(ex^2+d)^3}{x}dx}{6e}$$

$$\Big\downarrow \text{ 243}$$

$$\frac{(d+ex^2)^3(a+b\log(cx^n))}{6e}-\frac{bn\int\frac{(ex^2+d)^3}{x^2}dx^2}{12e}$$

$$\Big\downarrow \text{ 49}$$

$$\frac{(d+ex^2)^3(a+b\log(cx^n))}{6e}-\frac{bn\int\left(e^3x^4+3de^2x^2+3d^2e+\frac{d^3}{x^2}\right)dx^2}{12e}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{(d+ex^2)^3(a+b\log(cx^n))}{6e}-\frac{bn\left(d^3\log(x^2)+3d^2ex^2+\frac{3}{2}de^2x^4+\frac{e^3x^6}{3}\right)}{12e}$$

input
```
Int[x*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/12*(b*n*(3*d^2*e*x^2 + (3*d*e^2*x^4)/2 + (e^3*x^6)/3 + d^3*Log[x^2]))/e
 + ((d + e*x^2)^3*(a + b*Log[c*x^n]))/(6*e)
```

3.185.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.185.4 Maple [A] (verified)

Time = 0.72 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.33

method	result
parallelrisch	$\frac{x^{6} \ln\left(c\,x^{n}\right) b\,e^{2}}{6}-\frac{b\,e^{2} n\,x^{6}}{36}+\frac{a\,e^{2} x^{6}}{6}+\frac{x^{4} b \ln\left(c\,x^{n}\right) d e}{2}-\frac{b d e n\,x^{4}}{8}+\frac{x^{4} a d e}{2}+\frac{x^{2} b \ln\left(c\,x^{n}\right) d^{2}}{2}-\frac{b\,d^{2} n\,x^{2}}{4}+\frac{a\,d^{2} x^{2}}{2}$
risch	$\frac{\left(e\,x^{2}+d\right)^{3} b \ln\left(x^{n}\right)}{6 e}+\frac{i \pi b\,e^{2} x^{6} \operatorname{csgn}\left(i c\right) \operatorname{csgn}\left(i c\,x^{n}\right)^{2}}{12}+\frac{i \pi b d e\,x^{4} \operatorname{csgn}\left(i c\right) \operatorname{csgn}\left(i c\,x^{n}\right)^{2}}{4}-\frac{i \pi b d e\,x^{4} \operatorname{csgn}\left(i c\,x^{n}\right)^{3}}{4}-$

input
```
int(x*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/6*x^6*ln(c*x^n)*b*e^2-1/36*b*e^2*n*x^6+1/6*a*e^2*x^6+1/2*x^4*b*ln(c*x^n)
*d*e-1/8*b*d*e*n*x^4+1/2*x^4*a*d*e+1/2*x^2*b*ln(c*x^n)*d^2-1/4*b*d^2*n*x^2
+1/2*a*d^2*x^2
```

3.185.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.53

$$\int x(d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{36}\left(be^2n-6\,ae^2\right)x^6 - \frac{1}{8}\left(bden-4\,ade\right)x^4 - \frac{1}{4}\left(bd^2n-2\,ad^2\right)x^2 + \frac{1}{6}\left(be^2x^6+3\,bdex^4+3\,bd^2x^2\right)\log(c) + \frac{1}{6}\left(be^2nx^6+3\,bdenx^4+3\,bd^2nx^2\right)\log(x)$$

input
```
integrate(x*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/36*(b*e^2*n - 6*a*e^2)*x^6 - 1/8*(b*d*e*n - 4*a*d*e)*x^4 - 1/4*(b*d^2*n
 - 2*a*d^2)*x^2 + 1/6*(b*e^2*x^6 + 3*b*d*e*x^4 + 3*b*d^2*x^2)*log(c) + 1/6
*(b*e^2*n*x^6 + 3*b*d*e*n*x^4 + 3*b*d^2*n*x^2)*log(x)
```

3.185.6 Sympy [A] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.53

$$\int x(d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{ad^2x^2}{2} + \frac{adex^4}{2} + \frac{ae^2x^6}{6} - \frac{bd^2nx^2}{4} + \frac{bd^2x^2\log(cx^n)}{2} - \frac{bdenx^4}{8} + \frac{bdex^4\log(cx^n)}{2} - \frac{be^2nx^6}{36} + \frac{be^2x^6\log(cx^n)}{6}$$

input
```
integrate(x*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**2/2 + a*d*e*x**4/2 + a*e**2*x**6/6 - b*d**2*n*x**2/4 + b*d**2*x*
*2*log(c*x**n)/2 - b*d*e*n*x**4/8 + b*d*e*x**4*log(c*x**n)/2 - b*e**2*n*x*
*6/36 + b*e**2*x**6*log(c*x**n)/6
```

3.185.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.32

$$\int x(d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{36}be^2nx^6 + \frac{1}{6}be^2x^6\log(cx^n) + \frac{1}{6}ae^2x^6 - \frac{1}{8}bdenx^4 + \frac{1}{2}bdex^4\log(cx^n) + \frac{1}{2}adex^4 - \frac{1}{4}bd^2nx^2 + \frac{1}{2}bd^2x^2\log(cx^n) + \frac{1}{2}ad^2x^2$$

input
```
integrate(x*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*e^2*n*x^6 + 1/6*b*e^2*x^6*log(c*x^n) + 1/6*a*e^2*x^6 - 1/8*b*d*e*n
*x^4 + 1/2*b*d*e*x^4*log(c*x^n) + 1/2*a*d*e*x^4 - 1/4*b*d^2*n*x^2 + 1/2*b*
d^2*x^2*log(c*x^n) + 1/2*a*d^2*x^2
```

3.185.8 Giac [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.62

$$\int x(d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{1}{6}be^2nx^6\log(x) - \frac{1}{36}be^2nx^6 + \frac{1}{6}be^2x^6\log(c) + \frac{1}{6}ae^2x^6 + \frac{1}{2}bdenx^4\log(x) - \frac{1}{8}bdenx^4 + \frac{1}{2}bdex^4\log(c) + \frac{1}{2}adex^4 + \frac{1}{2}bd^2nx^2\log(x) - \frac{1}{4}bd^2nx^2 + \frac{1}{2}bd^2x^2\log(c) + \frac{1}{2}ad^2x^2$$

input
```
integrate(x*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/6*b*e^2*n*x^6*log(x) - 1/36*b*e^2*n*x^6 + 1/6*b*e^2*x^6*log(c) + 1/6*a*e
^2*x^6 + 1/2*b*d*e*n*x^4*log(x) - 1/8*b*d*e*n*x^4 + 1/2*b*d*e*x^4*log(c) +
 1/2*a*d*e*x^4 + 1/2*b*d^2*n*x^2*log(x) - 1/4*b*d^2*n*x^2 + 1/2*b*d^2*x^2*
log(c) + 1/2*a*d^2*x^2
```

3.185.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.08

$$\int x\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\ln\left(c\,x^n\right)\,\left(\frac{b\,d^2\,x^2}{2}+\frac{b\,d\,e\,x^4}{2}+\frac{b\,e^2\,x^6}{6}\right)+\frac{d^2\,x^2\,\left(2\,a-b\,n\right)}{4}+\frac{e^2\,x^6\,\left(6\,a-b\,n\right)}{36}+\frac{d\,e\,x^4\,\left(4\,a-b\,n\right)}{8}$$

input
```
int(x*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^2*x^2)/2 + (b*e^2*x^6)/6 + (b*d*e*x^4)/2) + (d^2*x^2*(2*a
 - b*n))/4 + (e^2*x^6*(6*a - b*n))/36 + (d*e*x^4*(4*a - b*n))/8
```

3.186 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x}\,dx$

3.186.1 Optimal result

Integrand size = 23, antiderivative size = 89

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x}\,dx = -\frac{1}{2}bdenx^2-\frac{1}{16}be^2nx^4-\frac{1}{2}bd^2n\log^2(x)+dex^2(a+b\log(cx^n))+\frac{1}{4}e^2x^4(a+b\log(cx^n))+d^2\log(x)(a+b\log(cx^n))$$

output
```
-1/2*b*d*e*n*x^2-1/16*b*e^2*n*x^4-1/2*b*d^2*n*ln(x)^2+d*e*x^2*(a+b*ln(c*x^
n))+1/4*e^2*x^4*(a+b*ln(c*x^n))+d^2*ln(x)*(a+b*ln(c*x^n))
```

3.186.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.92

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x}\,dx = \frac{1}{16}\left(-8bdenx^2-be^2nx^4+16dex^2(a+b\log(cx^n))+4e^2x^4(a+b\log(cx^n))+\frac{8d^2(a+b\log(cx^n))^2}{bn}\right)$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
(-8*b*d*e*n*x^2 - b*e^2*n*x^4 + 16*d*e*x^2*(a + b*Log[c*x^n]) + 4*e^2*x^4*
(a + b*Log[c*x^n]) + (8*d^2*(a + b*Log[c*x^n])^2)/(b*n))/16
```

3.186.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 88, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(\frac{e^2x^3}{4}+dex+\frac{d^2\log(x)}{x}\right)dx+d^2\log(x)(a+b\log(cx^n))+dex^2(a+b\log(cx^n))+\frac{1}{4}e^2x^4(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$d^2\log(x)(a+b\log(cx^n))+dex^2(a+b\log(cx^n))+\frac{1}{4}e^2x^4(a+b\log(cx^n))-bn\left(\frac{1}{2}d^2\log^2(x)+\frac{1}{2}dex^2+\frac{e^2x^4}{16}\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
-(b*n*((d*e*x^2)/2 + (e^2*x^4)/16 + (d^2*Log[x]^2)/2)) + d*e*x^2*(a + b*Lo
g[c*x^n]) + (e^2*x^4*(a + b*Log[c*x^n]))/4 + d^2*Log[x]*(a + b*Log[c*x^n])
```

3.186.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.186.4 Maple [A] (verified)

Time = 0.54 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.16

method	result	size
parallelrisch	$\frac{4x^4 \ln(c\,x^n) b\,e^2 n - x^4 b\,e^2 n^2 + 4x^4 a\,e^2 n + 16x^2 \ln(c\,x^n) bden - 8x^2 bde\,n^2 + 16x^2 aden + 16\ln(x) a\,d^2 n + 8b\,d^2 \ln(c\,x^n)^2}{16n}$	103
risch	Expression too large to display	3072

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/16*(4*x^4*ln(c*x^n)*b*e^2*n-x^4*b*e^2*n^2+4*x^4*a*e^2*n+16*x^2*ln(c*x^n)
*b*d*e*n-8*x^2*b*d*e*n^2+16*x^2*a*d*e*n+16*ln(x)*a*d^2*n+8*b*d^2*ln(c*x^n)
^2)/n
```

3.186.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x}\,dx = \frac{1}{2}\,bd^2 n\log(x)^2 - \frac{1}{16}\left(be^2 n - 4\,ae^2\right)x^4 - \frac{1}{2}\,(bden - 2\,ade)x^2 + \frac{1}{4}\left(be^2 x^4 + 4\,bdex^2\right)\log(c) + \frac{1}{4}\left(be^2 nx^4 + 4\,bdenx^2 + 4\,bd^2\log(c) + 4\,ad^2\right)\log(x)$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*b*d^2*n*log(x)^2 - 1/16*(b*e^2*n - 4*a*e^2)*x^4 - 1/2*(b*d*e*n - 2*a*d
*e)*x^2 + 1/4*(b*e^2*x^4 + 4*b*d*e*x^2)*log(c) + 1/4*(b*e^2*n*x^4 + 4*b*d*
e*n*x^2 + 4*b*d^2*log(c) + 4*a*d^2)*log(x)
```

3.186.6 Sympy [A] (verification not implemented)

Time = 0.47 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.49

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x}\,dx$$
$$= \begin{cases} \frac{ad^2\log(cx^n)}{n} + adex^2 + \frac{ae^2x^4}{4} + \frac{bd^2\log(cx^n)^2}{2n} - \frac{bdenx^2}{2} + bdex^2\log(cx^n) - \frac{be^2nx^4}{16} + \frac{be^2x^4\log(cx^n)}{4} & \text{for } n \neq 0 \\ (a+b\log(c))\left(d^2\log(x) + dex^2 + \frac{e^2x^4}{4}\right) & \text{otherwise} \end{cases}$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise((a*d**2*log(c*x**n)/n + a*d*e*x**2 + a*e**2*x**4/4 + b*d**2*log(
c*x**n)**2/(2*n) - b*d*e*n*x**2/2 + b*d*e*x**2*log(c*x**n) - b*e**2*n*x**4
/16 + b*e**2*x**4*log(c*x**n)/4, Ne(n, 0)), ((a + b*log(c))*(d**2*log(x) +
 d*e*x**2 + e**2*x**4/4), True))
```

3.186.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 88, normalized size of antiderivative = 0.99

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x}\,dx = -\frac{1}{16}\,be^2nx^4 + \frac{1}{4}\,be^2x^4\log(cx^n) + \frac{1}{4}\,ae^2x^4 - \frac{1}{2}\,bdenx^2 + bdex^2\log(cx^n) + adex^2 + \frac{bd^2\log(cx^n)^2}{2\,n} + ad^2\log(x)$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
-1/16*b*e^2*n*x^4 + 1/4*b*e^2*x^4*log(c*x^n) + 1/4*a*e^2*x^4 - 1/2*b*d*e*n
*x^2 + b*d*e*x^2*log(c*x^n) + a*d*e*x^2 + 1/2*b*d^2*log(c*x^n)^2/n + a*d^2
*log(x)
```

3.186.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.12

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x} dx = \frac{1}{2} bd^2 n \log(x)^2 - \frac{1}{16} \left(be^2 n - 4 be^2 \log(c) - 4 ae^2\right) x^4 - \frac{1}{2} (bden - 2 bde \log(c) - 2 ade) x^2 + \frac{1}{4} \left(be^2 n x^4 + 4 bdenx^2\right) \log(x) + \left(bd^2 \log(c) + ad^2\right) \log(x)$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
1/2*b*d^2*n*log(x)^2 - 1/16*(b*e^2*n - 4*b*e^2*log(c) - 4*a*e^2)*x^4 - 1/2
*(b*d*e*n - 2*b*d*e*log(c) - 2*a*d*e)*x^2 + 1/4*(b*e^2*n*x^4 + 4*b*d*e*n*x
^2)*log(x) + (b*d^2*log(c) + a*d^2)*log(x)
```

3.186.9 Mupad [B] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.90

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x} dx = \ln(c\,x^n) \left(\frac{b\,e^2\,x^4}{4} + b\,d\,e\,x^2\right) + \frac{e^2\,x^4\,(4\,a - b\,n)}{16} + a\,d^2\,\ln(x) + \frac{b\,d^2\ln(c\,x^n)^2}{2\,n} + \frac{d\,e\,x^2\,(2\,a - b\,n)}{2}$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x,x)
```

output
```
log(c*x^n)*((b*e^2*x^4)/4 + b*d*e*x^2) + (e^2*x^4*(4*a - b*n))/16 + a*d^2*
log(x) + (b*d^2*log(c*x^n)^2)/(2*n) + (d*e*x^2*(2*a - b*n))/2
```

3.187 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^3}\,dx$

3.187.1 Optimal result

Integrand size = 23, antiderivative size = 91

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^3}\,dx = -\frac{bd^2n}{4x^2} - \frac{1}{4}be^2nx^2 - bden\log^2(x) - \frac{d^2(a+b\log(cx^n))}{2x^2} + \frac{1}{2}e^2x^2(a+b\log(cx^n)) + 2de\log(x)(a+b\log(cx^n))$$

output
```
-1/4*b*d^2*n/x^2-1/4*b*e^2*n*x^2-b*d*e*n*ln(x)^2-1/2*d^2*(a+b*ln(c*x^n))/x
^2+1/2*e^2*x^2*(a+b*ln(c*x^n))+2*d*e*ln(x)*(a+b*ln(c*x^n))
```

3.187.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 83, normalized size of antiderivative = 0.91

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^3}\,dx = \frac{1}{4}\left(-\frac{bd^2n}{x^2} - be^2nx^2 - \frac{2d^2(a+b\log(cx^n))}{x^2} + 2e^2x^2(a+b\log(cx^n)) + \frac{4de(a+b\log(cx^n))^2}{bn}\right)$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(-((b*d^2*n)/x^2) - b*e^2*n*x^2 - (2*d^2*(a + b*Log[c*x^n]))/x^2 + 2*e^2*x
^2*(a + b*Log[c*x^n]) + (4*d*e*(a + b*Log[c*x^n])^2)/(b*n))/4
```

3.187.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 92, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^3} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{-e^2x^4-4de\log(x)x^2+d^2}{2x^3}dx-\frac{d^2(a+b\log(cx^n))}{2x^2}+2de\log(x)(a+b\log(cx^n))+\frac{1}{2}e^2x^2(a+b\log(cx^n))$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}bn\int \frac{-e^2x^4-4de\log(x)x^2+d^2}{x^3}dx-\frac{d^2(a+b\log(cx^n))}{2x^2}+2de\log(x)(a+b\log(cx^n))+\frac{1}{2}e^2x^2(a+b\log(cx^n))$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{2}bn\int \left(\frac{d^2-e^2x^4}{x^3}-\frac{4de\log(x)}{x}\right)dx-\frac{d^2(a+b\log(cx^n))}{2x^2}+2de\log(x)(a+b\log(cx^n))+\frac{1}{2}e^2x^2(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{2x^2}+2de\log(x)(a+b\log(cx^n))+\frac{1}{2}e^2x^2(a+b\log(cx^n))+\frac{1}{2}bn\left(-\frac{d^2}{2x^2}-2de\log^2(x)-\frac{e^2x^2}{2}\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-1/2*d^2/x^2 - (e^2*x^2)/2 - 2*d*e*Log[x]^2))/2 - (d^2*(a + b*Log[c*
x^n]))/(2*x^2) + (e^2*x^2*(a + b*Log[c*x^n]))/2 + 2*d*e*Log[x]*(a + b*Log[
c*x^n])
```

3.187.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.187.4 Maple [A] (verified)

Time = 0.51 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.14

method	result
parallelrisch	$\frac{2x^4 \ln(c\,x^n) b\,e^2 n - x^4 b\,e^2 n^2 + 2x^4 a\,e^2 n + 8\ln(x) x^2 a d e n + 4 b d e \ln(c\,x^n)^2 x^2 - 2\ln(c\,x^n) b\,d^2 n - b\,d^2 n^2 - 2a\,d^2 n}{4x^2 n}$
risch	$-\frac{b(-e^2x^4 - 4de\ln(x)x^2 + d^2)\ln(x^n)}{2x^2} - \frac{-4i\ln(x)\pi b d e\ \mathrm{csgn}(i x^n)\,\mathrm{csgn}(i c\,x^n)^2 x^2 + i\pi b\,d^2\,\mathrm{csgn}(i c)\,\mathrm{csgn}(i c\,x^n)^2 - i\pi b\,e^2 x^4\,\mathrm{csgn}}{}$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/4/x^2*(2*x^4*ln(c*x^n)*b*e^2*n-x^4*b*e^2*n^2+2*x^4*a*e^2*n+8*ln(x)*x^2*a
*d*e*n+4*b*d*e*ln(c*x^n)^2*x^2-2*ln(c*x^n)*b*d^2*n-b*d^2*n^2-2*a*d^2*n)/n
```

3.187.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 108, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^3}\,dx$$
$$= \frac{4\,bdenx^2\log(x)^2 - (be^2n-2\,ae^2)x^4 - bd^2n - 2\,ad^2 + 2\,(be^2x^4-bd^2)\log(c) + 2\,(be^2nx^4 + 4\,bdex^2\log(c)}{4\,x^2}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
1/4*(4*b*d*e*n*x^2*log(x)^2 - (b*e^2*n - 2*a*e^2)*x^4 - b*d^2*n - 2*a*d^2
+ 2*(b*e^2*x^4 - b*d^2)*log(c) + 2*(b*e^2*n*x^4 + 4*b*d*e*x^2*log(c) + 4*a
*d*e*x^2 - b*d^2*n)*log(x))/x^2
```

3.187.6 Sympy [A] (verification not implemented)

Time = 0.55 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.53

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^3}\,dx$$
$$= \begin{cases} -\frac{ad^2}{2x^2} + \frac{2ade\log(cx^n)}{n} + \frac{ae^2x^2}{2} - \frac{bd^2n}{4x^2} - \frac{bd^2\log(cx^n)}{2x^2} + \frac{bde\log(cx^n)^2}{n} - \frac{be^2nx^2}{4} + \frac{be^2x^2\log(cx^n)}{2} & \text{for } n \neq 0 \\ (a+b\log(c))\left(-\frac{d^2}{2x^2} + 2de\log(x) + \frac{e^2x^2}{2}\right) & \text{otherwise} \end{cases}$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Piecewise((-a*d**2/(2*x**2) + 2*a*d*e*log(c*x**n)/n + a*e**2*x**2/2 - b*d*
*2*n/(4*x**2) - b*d**2*log(c*x**n)/(2*x**2) + b*d*e*log(c*x**n)**2/n - b*e
**2*n*x**2/4 + b*e**2*x**2*log(c*x**n)/2, Ne(n, 0)), ((a + b*log(c))*(-d**
2/(2*x**2) + 2*d*e*log(x) + e**2*x**2/2), True))
```

3.187.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 91, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^3} dx = -\frac{1}{4} be^2nx^2 + \frac{1}{2} be^2x^2 \log(cx^n) + \frac{1}{2} ae^2x^2 + \frac{bde \log(cx^n)^2}{n} + 2 ade \log(x) - \frac{bd^2n}{4x^2} - \frac{bd^2 \log(cx^n)}{2x^2} - \frac{ad^2}{2x^2}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
-1/4*b*e^2*n*x^2 + 1/2*b*e^2*x^2*log(c*x^n) + 1/2*a*e^2*x^2 + b*d*e*log(c*
x^n)^2/n + 2*a*d*e*log(x) - 1/4*b*d^2*n/x^2 - 1/2*b*d^2*log(c*x^n)/x^2 - 1
/2*a*d^2/x^2
```

3.187.8 Giac [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.16

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^3} dx = \frac{1}{2} be^2x^2 \log(c) + bden \log(x)^2 + \frac{1}{4} (2x^2 \log(x) - x^2)be^2n + \frac{1}{2} ae^2x^2 - \frac{1}{4} bd^2n \left(\frac{2 \log(x)}{x^2} + \frac{1}{x^2}\right) + 2 bde \log(c) \log(|x|) + 2 ade \log(|x|) - \frac{bd^2 \log(c)}{2x^2} - \frac{ad^2}{2x^2}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
1/2*b*e^2*x^2*log(c) + b*d*e*n*log(x)^2 + 1/4*(2*x^2*log(x) - x^2)*b*e^2*n
 + 1/2*a*e^2*x^2 - 1/4*b*d^2*n*(2*log(x)/x^2 + 1/x^2) + 2*b*d*e*log(c)*log
(abs(x)) + 2*a*d*e*log(abs(x)) - 1/2*b*d^2*log(c)/x^2 - 1/2*a*d^2/x^2
```

3.187.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^3}\,dx = \ln(x)\,(2\,a\,d\,e+b\,d\,e\,n) - \frac{\frac{a\,d^2}{2}+\frac{b\,d^2\,n}{4}}{x^2} - \ln(c\,x^n)\left(\frac{\frac{b\,d^2}{2}+b\,d\,e\,x^2+\frac{b\,e^2\,x^4}{2}}{x^2}-b\,e^2\,x^2\right) + \frac{e^2\,x^2\,(2\,a-b\,n)}{4} + \frac{b\,d\,e\ln(c\,x^n)^2}{n}$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^3,x)
```

output
```
log(x)*(2*a*d*e + b*d*e*n) - ((a*d^2)/2 + (b*d^2*n)/4)/x^2 - log(c*x^n)*((
(b*d^2)/2 + (b*e^2*x^4)/2 + b*d*e*x^2)/x^2 - b*e^2*x^2) + (e^2*x^2*(2*a -
b*n))/4 + (b*d*e*log(c*x^n)^2)/n
```

3.188 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^5}\,dx$

3.188.1 Optimal result

Integrand size = 23, antiderivative size = 90

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^5}\,dx = -\frac{bd^2n}{16x^4}-\frac{bden}{2x^2}-\frac{1}{2}be^2n\log^2(x)-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{de(a+b\log(cx^n))}{x^2}+e^2\log(x)(a+b\log(cx^n))$$

output
```
-1/16*b*d^2*n/x^4-1/2*b*d*e*n/x^2-1/2*b*e^2*n*ln(x)^2-1/4*d^2*(a+b*ln(c*x^
n))/x^4-d*e*(a+b*ln(c*x^n))/x^2+e^2*ln(x)*(a+b*ln(c*x^n))
```

3.188.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.91

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^5}\,dx = \frac{1}{16}\left(-\frac{bd^2n}{x^4}-\frac{8bden}{x^2}-\frac{4d^2(a+b\log(cx^n))}{x^4}-\frac{16de(a+b\log(cx^n))}{x^2}+\frac{8e^2(a+b\log(cx^n))^2}{bn}\right)$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(-((b*d^2*n)/x^4) - (8*b*d*e*n)/x^2 - (4*d^2*(a + b*Log[c*x^n]))/x^4 - (16
*d*e*(a + b*Log[c*x^n]))/x^2 + (8*e^2*(a + b*Log[c*x^n])^2)/(b*n))/16
```

3.188.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 89, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d+ex^2\right)^2 (a+b\log (cx^n))}{x^5} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(\frac{e^2\log(x)}{x}-\frac{d\left(4ex^2+d\right)}{4x^5}\right)dx-\frac{d^2(a+b\log (cx^n))}{4x^4}-\frac{de(a+b\log (cx^n))}{x^2}+e^2\log(x) (a+b\log (cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log (cx^n))}{4x^4}-\frac{de(a+b\log (cx^n))}{x^2}+e^2\log(x) (a+b\log (cx^n))-bn\left(\frac{d^2}{16x^4}+\frac{de}{2x^2}+\frac{1}{2}e^2\log^2(x)\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
-(b*n*(d^2/(16*x^4) + (d*e)/(2*x^2) + (e^2*Log[x]^2)/2)) - (d^2*(a + b*Log
[c*x^n]))/(4*x^4) - (d*e*(a + b*Log[c*x^n]))/x^2 + e^2*Log[x]*(a + b*Log[c
*x^n])
```

3.188.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.188.4 Maple [A] (verified)

Time = 0.48 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.14

method	result
parallelrisch	$\frac{16\ln(x)x^4ae^2n+8e^2b\ln(cx^n)^2x^4-16x^2\ln(cx^n)bden-8x^2bden^2-16x^2aden-4\ln(cx^n)bd^2n-bd^2n^2-4ad^2n}{16x^4n}$
risch	$-\frac{b(-4e^2\ln(x)x^4+4dex^2+d^2)\ln(x^n)}{4x^4}-\frac{2i\pi bd^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(icx^n)^2-8i\ln(x)\pi be^2\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(icx^n)^2x^4-2i\pi bd^2\,\mathrm{csgn}}{}$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
1/16/x^4*(16*ln(x)*x^4*a*e^2*n+8*e^2*b*ln(c*x^n)^2*x^4-16*x^2*ln(c*x^n)*b*
d*e*n-8*x^2*b*d*e*n^2-16*x^2*a*d*e*n-4*ln(c*x^n)*b*d^2*n-b*d^2*n^2-4*a*d^2
*n)/n
```

3.188.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 108, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^5}\,dx$$
$$=\frac{8\,be^2nx^4\log(x)^2-bd^2n-4\,ad^2-8\,(bden+2\,ade)x^2-4\,(4\,bdex^2+bd^2)\log(c)+4\,(4\,be^2x^4\log(c)+4\,ae}{16\,x^4}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
1/16*(8*b*e^2*n*x^4*log(x)^2 - b*d^2*n - 4*a*d^2 - 8*(b*d*e*n + 2*a*d*e)*x
^2 - 4*(4*b*d*e*x^2 + b*d^2)*log(c) + 4*(4*b*e^2*x^4*log(c) + 4*a*e^2*x^4
- 4*b*d*e*n*x^2 - b*d^2*n)*log(x))/x^4
```

3.188.6 Sympy [A] (verification not implemented)

Time = 1.71 (sec) , antiderivative size = 105, normalized size of antiderivative = 1.17

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^5} dx = -\frac{ad^2}{4x^4} - \frac{ade}{x^2} + ae^2\log(x) + bd^2\left(-\frac{n}{16x^4} - \frac{\log(cx^n)}{4x^4}\right) + 2bde\left(-\frac{n}{4x^2} - \frac{\log(cx^n)}{2x^2}\right) - be^2\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right)$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**5,x)
```

output
```
-a*d**2/(4*x**4) - a*d*e/x**2 + a*e**2*log(x) + b*d**2*(-n/(16*x**4) - log
(c*x**n)/(4*x**4)) + 2*b*d*e*(-n/(4*x**2) - log(c*x**n)/(2*x**2)) - b*e**2
*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True))
```

3.188.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^5} dx = \frac{be^2\log(cx^n)^2}{2n} + ae^2\log(x) - \frac{bden}{2x^2} - \frac{bde\log(cx^n)}{x^2} - \frac{ade}{x^2} - \frac{bd^2n}{16x^4} - \frac{bd^2\log(cx^n)}{4x^4} - \frac{ad^2}{4x^4}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
1/2*b*e^2*log(c*x^n)^2/n + a*e^2*log(x) - 1/2*b*d*e*n/x^2 - b*d*e*log(c*x^
n)/x^2 - a*d*e/x^2 - 1/16*b*d^2*n/x^4 - 1/4*b*d^2*log(c*x^n)/x^4 - 1/4*a*d
^2/x^4
```

3.188.8 Giac [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.14

$$\int \frac{(d+ex^2)^2\,(a+b\log{(cx^n)})}{x^5}\,dx = \frac{1}{2}\,be^2n\log{(x)}^2 - \frac{1}{2}\,bden\left(\frac{2\,\log{(x)}}{x^2}+\frac{1}{x^2}\right) - \frac{1}{16}\,bd^2n\left(\frac{4\,\log{(x)}}{x^4}+\frac{1}{x^4}\right) + be^2\log{(c)}\log{(|x|)} + ae^2\log{(|x|)} - \frac{bde\log{(c)}}{x^2} - \frac{ade}{x^2} - \frac{bd^2\log{(c)}}{4\,x^4} - \frac{ad^2}{4\,x^4}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
1/2*b*e^2*n*log(x)^2 - 1/2*b*d*e*n*(2*log(x)/x^2 + 1/x^2) - 1/16*b*d^2*n*(
4*log(x)/x^4 + 1/x^4) + b*e^2*log(c)*log(abs(x)) + a*e^2*log(abs(x)) - b*d
*e*log(c)/x^2 - a*d*e/x^2 - 1/4*b*d^2*log(c)/x^4 - 1/4*a*d^2/x^4
```

3.188.9 Mupad [B] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 102, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^2)^2\,(a+b\log{(cx^n)})}{x^5}\,dx = \ln{(x)}\,\left(a\,e^2+\frac{3\,b\,e^2\,n}{4}\right) - \frac{x^2\,(4\,a\,d\,e+2\,b\,d\,e\,n)+a\,d^2+\frac{b\,d^2\,n}{4}}{4\,x^4} - \frac{\ln{(c\,x^n)}\,\left(\frac{b\,d^2}{4}+b\,d\,e\,x^2+\frac{3\,b\,e^2\,x^4}{4}\right)}{x^4} + \frac{b\,e^2\ln{(c\,x^n)}^2}{2\,n}$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^5,x)
```

output
```
log(x)*(a*e^2 + (3*b*e^2*n)/4) - (x^2*(4*a*d*e + 2*b*d*e*n) + a*d^2 + (b*d
^2*n)/4)/(4*x^4) - (log(c*x^n)*((b*d^2)/4 + (3*b*e^2*x^4)/4 + b*d*e*x^2))/
x^4 + (b*e^2*log(c*x^n)^2)/(2*n)
```

3.189 $\int x^4(d+ex^2)^2 (a+b\log(cx^n))\,dx$

3.189.1 Optimal result

Integrand size = 23, antiderivative size = 74

$$\int x^4(d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{25}bd^2nx^5 - \frac{2}{49}bdenx^7 - \frac{1}{81}be^2nx^9 + \frac{1}{315}(63d^2x^5+90dex^7+35e^2x^9)(a+b\log(cx^n))$$

output
```
-1/25*b*d^2*n*x^5-2/49*b*d*e*n*x^7-1/81*b*e^2*n*x^9+1/315*(35*e^2*x^9+90*d
*e*x^7+63*d^2*x^5)*(a+b*ln(c*x^n))
```

3.189.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 95, normalized size of antiderivative = 1.28

$$\int x^4(d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{25}bd^2nx^5 - \frac{2}{49}bdenx^7 - \frac{1}{81}be^2nx^9 + \frac{1}{5}d^2x^5(a+b\log(cx^n)) + \frac{2}{7}dex^7(a+b\log(cx^n)) + \frac{1}{9}e^2x^9(a+b\log(cx^n))$$

input
```
Integrate[x^4*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/25*(b*d^2*n*x^5) - (2*b*d*e*n*x^7)/49 - (b*e^2*n*x^9)/81 + (d^2*x^5*(a
+ b*Log[c*x^n]))/5 + (2*d*e*x^7*(a + b*Log[c*x^n]))/7 + (e^2*x^9*(a + b*Lo
g[c*x^n]))/9
```

3.189.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 73, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4 (d+ex^2)^2 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \; 2771$$

$$\frac{1}{315}(63d^2x^5+90dex^7+35e^2x^9)(a+b\log(cx^n))-bn\int\left(\frac{e^2x^8}{9}+\frac{2}{7}dex^6+\frac{d^2x^4}{5}\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{315}(63d^2x^5+90dex^7+35e^2x^9)(a+b\log(cx^n))-bn\left(\frac{d^2x^5}{25}+\frac{2}{49}dex^7+\frac{e^2x^9}{81}\right)$$

input
```
Int[x^4*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d^2*x^5)/25 + (2*d*e*x^7)/49 + (e^2*x^9)/81)) + ((63*d^2*x^5 + 90*
d*e*x^7 + 35*e^2*x^9)*(a + b*Log[c*x^n]))/315
```

3.189.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.189.4 Maple [A] (verified)

Time = 0.95 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^{9} b \ln \left(c \,x^{n}\right) e^{2}}{9}-\frac{b \,e^{2} n \,x^{9}}{81}+\frac{x^{9} a \,e^{2}}{9}+\frac{2 x^{7} b \ln \left(c \,x^{n}\right) d e}{7}-\frac{2 b d e n \,x^{7}}{49}+\frac{2 x^{7} a d e}{7}+\frac{x^{5} b \ln \left(c \,x^{n}\right) d^{2}}{5}-\frac{b \,d^{2} n \,x^{5}}{25}+\frac{x^{5} a \,d^{2}}{5}$
risch	$\frac{b \,x^{5} \left(35 e^{2} x^{4}+90 d e \,x^{2}+63 d^{2}\right) \ln \left(x^{n}\right)}{315}+\frac{i \pi b \,d^{2} x^{5} \operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}}{10}+\frac{i \pi b \,d^{2} x^{5} \operatorname{csgn}\left(i c\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}}{10}-\frac{i \pi b d e \,x^{7} \operatorname{csgn}(}{}$

input
```
int(x^4*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/9*x^9*b*ln(c*x^n)*e^2-1/81*b*e^2*n*x^9+1/9*x^9*a*e^2+2/7*x^7*b*ln(c*x^n)
*d*e-2/49*b*d*e*n*x^7+2/7*x^7*a*d*e+1/5*x^5*b*ln(c*x^n)*d^2-1/25*b*d^2*n*x
^5+1/5*x^5*a*d^2
```

3.189.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\begin{aligned}\int x^4\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)\,dx = & -\frac{1}{81}\left(be^2n-9\,ae^2\right)x^9-\frac{2}{49}\left(bden-7\,ade\right)x^7 \\ & -\frac{1}{25}\left(bd^2n-5\,ad^2\right)x^5 \\ & +\frac{1}{315}\left(35\,be^2x^9+90\,bdex^7+63\,bd^2x^5\right)\log\left(c\right) \\ & +\frac{1}{315}\left(35\,be^2nx^9+90\,bdenx^7+63\,bd^2nx^5\right)\log\left(x\right)\end{aligned}$$

input
```
integrate(x^4*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/81*(b*e^2*n - 9*a*e^2)*x^9 - 2/49*(b*d*e*n - 7*a*d*e)*x^7 - 1/25*(b*d^2
*n - 5*a*d^2)*x^5 + 1/315*(35*b*e^2*x^9 + 90*b*d*e*x^7 + 63*b*d^2*x^5)*log
(c) + 1/315*(35*b*e^2*n*x^9 + 90*b*d*e*n*x^7 + 63*b*d^2*n*x^5)*log(x)
```

3.189.6 Sympy [A] (verification not implemented)

Time = 1.23 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.64

$$\int x^4 (d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{ad^2x^5}{5} + \frac{2adex^7}{7} + \frac{ae^2x^9}{9} - \frac{bd^2nx^5}{25} + \frac{bd^2x^5\log(cx^n)}{5} - \frac{2bdenx^7}{49} + \frac{2bdex^7\log(cx^n)}{7} - \frac{be^2nx^9}{81} + \frac{be^2x^9\log(cx^n)}{9}$$

input
```
integrate(x**4*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**5/5 + 2*a*d*e*x**7/7 + a*e**2*x**9/9 - b*d**2*n*x**5/25 + b*d**2
*x**5*log(c*x**n)/5 - 2*b*d*e*n*x**7/49 + 2*b*d*e*x**7*log(c*x**n)/7 - b*e
**2*n*x**9/81 + b*e**2*x**9*log(c*x**n)/9
```

3.189.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x^4 (d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{81}be^2nx^9 + \frac{1}{9}be^2x^9\log(cx^n) + \frac{1}{9}ae^2x^9 - \frac{2}{49}bdenx^7 + \frac{2}{7}bdex^7\log(cx^n) + \frac{2}{7}adex^7 - \frac{1}{25}bd^2nx^5 + \frac{1}{5}bd^2x^5\log(cx^n) + \frac{1}{5}ad^2x^5$$

input
```
integrate(x^4*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/81*b*e^2*n*x^9 + 1/9*b*e^2*x^9*log(c*x^n) + 1/9*a*e^2*x^9 - 2/49*b*d*e*
n*x^7 + 2/7*b*d*e*x^7*log(c*x^n) + 2/7*a*d*e*x^7 - 1/25*b*d^2*n*x^5 + 1/5*
b*d^2*x^5*log(c*x^n) + 1/5*a*d^2*x^5
```

3.189.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x^4(d+ex^2)^2(a+b\log(cx^n))\,dx = \frac{1}{9}be^2nx^9\log(x) - \frac{1}{81}be^2nx^9 + \frac{1}{9}be^2x^9\log(c) + \frac{1}{9}ae^2x^9 + \frac{2}{7}bdenx^7\log(x) - \frac{2}{49}bdenx^7 + \frac{2}{7}bdex^7\log(c) + \frac{2}{7}adex^7 + \frac{1}{5}bd^2nx^5\log(x) - \frac{1}{25}bd^2nx^5 + \frac{1}{5}bd^2x^5\log(c) + \frac{1}{5}ad^2x^5$$

input
```
integrate(x^4*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/9*b*e^2*n*x^9*log(x) - 1/81*b*e^2*n*x^9 + 1/9*b*e^2*x^9*log(c) + 1/9*a*e
^2*x^9 + 2/7*b*d*e*n*x^7*log(x) - 2/49*b*d*e*n*x^7 + 2/7*b*d*e*x^7*log(c)
+ 2/7*a*d*e*x^7 + 1/5*b*d^2*n*x^5*log(x) - 1/25*b*d^2*n*x^5 + 1/5*b*d^2*x^
5*log(c) + 1/5*a*d^2*x^5
```

3.189.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x^4(d+ex^2)^2(a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^2\,x^5}{5} + \frac{2\,b\,d\,e\,x^7}{7} + \frac{b\,e^2\,x^9}{9}\right) + \frac{d^2\,x^5\,(5\,a-b\,n)}{25} + \frac{e^2\,x^9\,(9\,a-b\,n)}{81} + \frac{2\,d\,e\,x^7\,(7\,a-b\,n)}{49}$$

input
```
int(x^4*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^2*x^5)/5 + (b*e^2*x^9)/9 + (2*b*d*e*x^7)/7) + (d^2*x^5*(5
*a - b*n))/25 + (e^2*x^9*(9*a - b*n))/81 + (2*d*e*x^7*(7*a - b*n))/49
```

3.190 $\int x^2(d+ex^2)^2 (a+b\log(cx^n))\,dx$

3.190.1 Optimal result

Integrand size = 23, antiderivative size = 74

$$\int x^2(d+ex^2)^2(a+b\log(cx^n))\,dx = -\frac{1}{9}bd^2nx^3-\frac{2}{25}bdenx^5-\frac{1}{49}be^2nx^7+\frac{1}{105}\left(35d^2x^3+42dex^5+15e^2x^7\right)(a+b\log(cx^n))$$

output
```
-1/9*b*d^2*n*x^3-2/25*b*d*e*n*x^5-1/49*b*e^2*n*x^7+1/105*(15*e^2*x^7+42*d*
e*x^5+35*d^2*x^3)*(a+b*ln(c*x^n))
```

3.190.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 95, normalized size of antiderivative = 1.28

$$\int x^2(d+ex^2)^2(a+b\log(cx^n))\,dx = -\frac{1}{9}bd^2nx^3-\frac{2}{25}bdenx^5-\frac{1}{49}be^2nx^7+\frac{1}{3}d^2x^3(a+b\log(cx^n))+\frac{2}{5}dex^5(a+b\log(cx^n))+\frac{1}{7}e^2x^7(a+b\log(cx^n))$$

input
```
Integrate[x^2*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/9*(b*d^2*n*x^3) - (2*b*d*e*n*x^5)/25 - (b*e^2*n*x^7)/49 + (d^2*x^3*(a +
 b*Log[c*x^n]))/3 + (2*d*e*x^5*(a + b*Log[c*x^n]))/5 + (e^2*x^7*(a + b*Log
[c*x^n]))/7
```

3.190.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 73, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2 (d+ex^2)^2 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{105}(35d^2x^3+42dex^5+15e^2x^7)(a+b\log(cx^n))-bn\int\left(\frac{e^2x^6}{7}+\frac{2}{5}dex^4+\frac{d^2x^2}{3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{105}(35d^2x^3+42dex^5+15e^2x^7)(a+b\log(cx^n))-bn\left(\frac{d^2x^3}{9}+\frac{2}{25}dex^5+\frac{e^2x^7}{49}\right)$$

input
```
Int[x^2*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d^2*x^3)/9 + (2*d*e*x^5)/25 + (e^2*x^7)/49)) + ((35*d^2*x^3 + 42*d
*e*x^5 + 15*e^2*x^7)*(a + b*Log[c*x^n]))/105
```

3.190.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.190.4 Maple [A] (verified)

Time = 0.54 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.36

method	result
parallelrisch	$\frac{x^7 b \ln(c x^n) e^2}{7} - \frac{b e^2 n x^7}{49} + \frac{x^7 a e^2}{7} + \frac{2x^5 \ln(c x^n) bde}{5} - \frac{2bden x^5}{25} + \frac{2ade x^5}{5} + \frac{x^3 b \ln(c x^n) d^2}{3} - \frac{b d^2 n x^3}{9} + \frac{a d^2 x^3}{3}$
risch	$\frac{b x^3 (15e^2 x^4 + 42de x^2 + 35d^2) \ln(x^n)}{105} + \frac{i\pi b d^2 x^3 \operatorname{csgn}(ic) \operatorname{csgn}(ic x^n)^2}{6} - \frac{i\pi b e^2 x^7 \operatorname{csgn}(ic x^n)^3}{14} + \frac{i\pi bde x^5 \operatorname{csgn}(ix^n) \operatorname{csgn}(}{5}$

input
```
int(x^2*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/7*x^7*b*ln(c*x^n)*e^2-1/49*b*e^2*n*x^7+1/7*x^7*a*e^2+2/5*x^5*ln(c*x^n)*b
*d*e-2/25*b*d*e*n*x^5+2/5*a*d*e*x^5+1/3*x^3*b*ln(c*x^n)*d^2-1/9*b*d^2*n*x^
3+1/3*a*d^2*x^3
```

3.190.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.59

$$\int x^2 (d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{49}(be^2n - 7ae^2)x^7 - \frac{2}{25}(bden - 5ade)x^5 - \frac{1}{9}(bd^2n - 3ad^2)x^3 + \frac{1}{105}(15be^2x^7 + 42bdex^5 + 35bd^2x^3)\log(c) + \frac{1}{105}(15be^2nx^7 + 42bdenx^5 + 35bd^2nx^3)\log(x)$$

input
```
integrate(x^2*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/49*(b*e^2*n - 7*a*e^2)*x^7 - 2/25*(b*d*e*n - 5*a*d*e)*x^5 - 1/9*(b*d^2*
n - 3*a*d^2)*x^3 + 1/105*(15*b*e^2*x^7 + 42*b*d*e*x^5 + 35*b*d^2*x^3)*log(
c) + 1/105*(15*b*e^2*n*x^7 + 42*b*d*e*n*x^5 + 35*b*d^2*n*x^3)*log(x)
```

3.190.6 Sympy [A] (verification not implemented)

Time = 0.66 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.64

$$\int x^2 (d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{ad^2x^3}{3} + \frac{2adex^5}{5} + \frac{ae^2x^7}{7} - \frac{bd^2nx^3}{9} + \frac{bd^2x^3\log(cx^n)}{3} - \frac{2bdenx^5}{25} + \frac{2bdex^5\log(cx^n)}{5} - \frac{be^2nx^7}{49} + \frac{be^2x^7\log(cx^n)}{7}$$

input
```
integrate(x**2*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**3/3 + 2*a*d*e*x**5/5 + a*e**2*x**7/7 - b*d**2*n*x**3/9 + b*d**2*
x**3*log(c*x**n)/3 - 2*b*d*e*n*x**5/25 + 2*b*d*e*x**5*log(c*x**n)/5 - b*e*
*2*n*x**7/49 + b*e**2*x**7*log(c*x**n)/7
```

3.190.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.35

$$\int x^2 (d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{1}{49}be^2nx^7 + \frac{1}{7}be^2x^7\log(cx^n) + \frac{1}{7}ae^2x^7 - \frac{2}{25}bdenx^5 + \frac{2}{5}bdex^5\log(cx^n) + \frac{2}{5}adex^5 - \frac{1}{9}bd^2nx^3 + \frac{1}{3}bd^2x^3\log(cx^n) + \frac{1}{3}ad^2x^3$$

input
```
integrate(x^2*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/49*b*e^2*n*x^7 + 1/7*b*e^2*x^7*log(c*x^n) + 1/7*a*e^2*x^7 - 2/25*b*d*e*
n*x^5 + 2/5*b*d*e*x^5*log(c*x^n) + 2/5*a*d*e*x^5 - 1/9*b*d^2*n*x^3 + 1/3*b
*d^2*x^3*log(c*x^n) + 1/3*a*d^2*x^3
```

3.190.8 Giac [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.66

$$\int x^2 (d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{1}{7}be^2nx^7\log(x) - \frac{1}{49}be^2nx^7 + \frac{1}{7}be^2x^7\log(c) + \frac{1}{7}ae^2x^7 + \frac{2}{5}bdenx^5\log(x) - \frac{2}{25}bdenx^5 + \frac{2}{5}bdex^5\log(c) + \frac{2}{5}adex^5 + \frac{1}{3}bd^2nx^3\log(x) - \frac{1}{9}bd^2nx^3 + \frac{1}{3}bd^2x^3\log(c) + \frac{1}{3}ad^2x^3$$

input
```
integrate(x^2*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/7*b*e^2*n*x^7*log(x) - 1/49*b*e^2*n*x^7 + 1/7*b*e^2*x^7*log(c) + 1/7*a*e
^2*x^7 + 2/5*b*d*e*n*x^5*log(x) - 2/25*b*d*e*n*x^5 + 2/5*b*d*e*x^5*log(c)
+ 2/5*a*d*e*x^5 + 1/3*b*d^2*n*x^3*log(x) - 1/9*b*d^2*n*x^3 + 1/3*b*d^2*x^3
*log(c) + 1/3*a*d^2*x^3
```

3.190.9 Mupad [B] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.11

$$\int x^2 (d+ex^2)^2 (a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^2\,x^3}{3} + \frac{2\,b\,d\,e\,x^5}{5} + \frac{b\,e^2\,x^7}{7}\right) + \frac{d^2\,x^3\,(3\,a-b\,n)}{9} + \frac{e^2\,x^7\,(7\,a-b\,n)}{49} + \frac{2\,d\,e\,x^5\,(5\,a-b\,n)}{25}$$

input
```
int(x^2*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^2*x^3)/3 + (b*e^2*x^7)/7 + (2*b*d*e*x^5)/5) + (d^2*x^3*(3
*a - b*n))/9 + (e^2*x^7*(7*a - b*n))/49 + (2*d*e*x^5*(5*a - b*n))/25
```

3.191 $\int (d+ex^2)^2 (a+b\log(cx^n))\,dx$

3.191.1 Optimal result

Integrand size = 20, antiderivative size = 86

$$\int (d+ex^2)^2 (a+b\log(cx^n))\,dx = -bd^2nx - \frac{2}{9}bdenx^3 - \frac{1}{25}be^2nx^5 + d^2x(a+b\log(cx^n)) + \frac{2}{3}dex^3(a+b\log(cx^n)) + \frac{1}{5}e^2x^5(a+b\log(cx^n))$$

output
```
-b*d^2*n*x-2/9*b*d*e*n*x^3-1/25*b*e^2*n*x^5+d^2*x*(a+b*ln(c*x^n))+2/3*d*e*
x^3*(a+b*ln(c*x^n))+1/5*e^2*x^5*(a+b*ln(c*x^n))
```

3.191.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 89, normalized size of antiderivative = 1.03

$$\int (d+ex^2)^2 (a+b\log(cx^n))\,dx = ad^2x - bd^2nx - \frac{2}{9}bdenx^3 - \frac{1}{25}be^2nx^5 + bd^2x\log(cx^n) + \frac{2}{3}dex^3(a+b\log(cx^n)) + \frac{1}{5}e^2x^5(a+b\log(cx^n))$$

input
```
Integrate[(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
a*d^2*x - b*d^2*n*x - (2*b*d*e*n*x^3)/9 - (b*e^2*n*x^5)/25 + b*d^2*x*Log[c
*x^n] + (2*d*e*x^3*(a + b*Log[c*x^n]))/3 + (e^2*x^5*(a + b*Log[c*x^n]))/5
```

3.191.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 84, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2750, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)^2 (a+b\log (cx^n)) \, dx$$

$$\Big\downarrow \text{2750}$$

$$-bn\int \left(\frac{e^2x^4}{5}+\frac{2}{3}dex^2+d^2\right)dx+d^2x(a+b\log (cx^n))+\frac{2}{3}dex^3(a+b\log (cx^n))+\frac{1}{5}e^2x^5(a+b\log (cx^n))$$

$$\Big\downarrow \text{2009}$$

$$d^2x(a+b\log (cx^n))+\frac{2}{3}dex^3(a+b\log (cx^n))+\frac{1}{5}e^2x^5(a+b\log (cx^n))-bn\left(d^2x+\frac{2}{9}dex^3+\frac{e^2x^5}{25}\right)$$

input
```
Int[(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*(d^2*x + (2*d*e*x^3)/9 + (e^2*x^5)/25)) + d^2*x*(a + b*Log[c*x^n]) +
 (2*d*e*x^3*(a + b*Log[c*x^n]))/3 + (e^2*x^5*(a + b*Log[c*x^n]))/5
```

3.191.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

3.191.4 Maple [A] (verified)

Time = 0.45 (sec) , antiderivative size = 93, normalized size of antiderivative = 1.08

method	result
parallelrisch	$\frac{x^5 b \ln(c\,x^n) e^2}{5} - \frac{b\,e^2 n\,x^5}{25} + \frac{x^5 a\,e^2}{5} + \frac{2x^3 b \ln(c\,x^n) de}{3} - \frac{2bden\,x^3}{9} + \frac{2x^3 ade}{3} + xb \ln\left(c\,x^n\right) d^2 - b\,d^2 nx + a$
risch	$\frac{bx(3e^2x^4+10de\,x^2+15d^2)\ln(x^n)}{15} + \frac{i\pi b\,e^2 x^5 \operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2}{10} - \frac{i\pi bde\,x^3 \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)}{3} + \frac{i\pi b\,d^2 \operatorname{csg}}{}$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/5*x^5*b*ln(c*x^n)*e^2-1/25*b*e^2*n*x^5+1/5*x^5*a*e^2+2/3*x^3*b*ln(c*x^n)
*d*e-2/9*b*d*e*n*x^3+2/3*x^3*a*d*e+x*b*ln(c*x^n)*d^2-b*d^2*n*x+a*d^2*x
```

3.191.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.30

$$\begin{aligned}\int \left(d+ex^2\right)^2 (a+b\log(cx^n))\,dx = &-\frac{1}{25}\left(be^2n-5\,ae^2\right)x^5 \\ &-\frac{2}{9}\left(bden-3\,ade\right)x^3-\left(bd^2n-ad^2\right)x \\ &+\frac{1}{15}\left(3\,be^2x^5+10\,bdex^3+15\,bd^2x\right)\log(c) \\ &+\frac{1}{15}\left(3\,be^2nx^5+10\,bdenx^3+15\,bd^2nx\right)\log(x)\end{aligned}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/25*(b*e^2*n - 5*a*e^2)*x^5 - 2/9*(b*d*e*n - 3*a*d*e)*x^3 - (b*d^2*n - a
*d^2)*x + 1/15*(3*b*e^2*x^5 + 10*b*d*e*x^3 + 15*b*d^2*x)*log(c) + 1/15*(3*
b*e^2*n*x^5 + 10*b*d*e*n*x^3 + 15*b*d^2*n*x)*log(x)
```

3.191.6 Sympy [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.28

$$\int \left(d+ex^2\right)^2 (a+b\log(cx^n))\,dx = ad^2x + \frac{2adex^3}{3} + \frac{ae^2x^5}{5} - bd^2nx + bd^2x\log(cx^n) - \frac{2bdenx^3}{9} + \frac{2bdex^3\log(cx^n)}{3} - \frac{be^2nx^5}{25} + \frac{be^2x^5\log(cx^n)}{5}$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x + 2*a*d*e*x**3/3 + a*e**2*x**5/5 - b*d**2*n*x + b*d**2*x*log(c*x*
*n) - 2*b*d*e*n*x**3/9 + 2*b*d*e*x**3*log(c*x**n)/3 - b*e**2*n*x**5/25 + b
*e**2*x**5*log(c*x**n)/5
```

3.191.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 92, normalized size of antiderivative = 1.07

$$\int \left(d+ex^2\right)^2 (a+b\log(cx^n))\,dx = -\frac{1}{25}\,be^2nx^5 + \frac{1}{5}\,be^2x^5\log(cx^n) + \frac{1}{5}\,ae^2x^5 - \frac{2}{9}\,bdenx^3 + \frac{2}{3}\,bdex^3\log(cx^n) + \frac{2}{3}\,adex^3 - bd^2nx + bd^2x\log(cx^n) + ad^2x$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*e^2*n*x^5 + 1/5*b*e^2*x^5*log(c*x^n) + 1/5*a*e^2*x^5 - 2/9*b*d*e*n
*x^3 + 2/3*b*d*e*x^3*log(c*x^n) + 2/3*a*d*e*x^3 - b*d^2*n*x + b*d^2*x*log(
c*x^n) + a*d^2*x
```

3.191.8 Giac [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.30

$$\int (d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{1}{5}be^2nx^5\log(x) - \frac{1}{25}be^2nx^5 + \frac{1}{5}be^2x^5\log(c) + \frac{1}{5}ae^2x^5 + \frac{2}{3}bdenx^3\log(x) - \frac{2}{9}bdenx^3 + \frac{2}{3}bdex^3\log(c) + \frac{2}{3}adex^3 + bd^2nx\log(x) - bd^2nx + bd^2x\log(c) + ad^2x$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/5*b*e^2*n*x^5*log(x) - 1/25*b*e^2*n*x^5 + 1/5*b*e^2*x^5*log(c) + 1/5*a*e
^2*x^5 + 2/3*b*d*e*n*x^3*log(x) - 2/9*b*d*e*n*x^3 + 2/3*b*d*e*x^3*log(c) +
 2/3*a*d*e*x^3 + b*d^2*n*x*log(x) - b*d^2*n*x + b*d^2*x*log(c) + a*d^2*x
```

3.191.9 Mupad [B] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 74, normalized size of antiderivative = 0.86

$$\int (d+ex^2)^2 (a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(b\,d^2\,x + \frac{2\,b\,d\,e\,x^3}{3} + \frac{b\,e^2\,x^5}{5}\right) + \frac{e^2\,x^5\,(5\,a-b\,n)}{25} + d^2\,x\,(a-b\,n) + \frac{2\,d\,e\,x^3\,(3\,a-b\,n)}{9}$$

input
```
int((d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*e^2*x^5)/5 + b*d^2*x + (2*b*d*e*x^3)/3) + (e^2*x^5*(5*a - b
*n))/25 + d^2*x*(a - b*n) + (2*d*e*x^3*(3*a - b*n))/9
```

3.192 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^2} dx$

3.192.1 Optimal result

Integrand size = 23, antiderivative size = 83

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^2} dx = -\frac{bd^2n}{x} - 2bdenx - \frac{1}{9}be^2nx^3 - \frac{d^2(a+b\log(cx^n))}{x} + 2dex(a+b\log(cx^n)) + \frac{1}{3}e^2x^3(a+b\log(cx^n))$$

output
```
-b*d^2*n/x-2*b*d*e*n*x-1/9*b*e^2*n*x^3-d^2*(a+b*ln(c*x^n))/x+2*d*e*x*(a+b*
ln(c*x^n))+1/3*e^2*x^3*(a+b*ln(c*x^n))
```

3.192.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 86, normalized size of antiderivative = 1.04

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^2} dx = -\frac{bd^2n}{x} + 2adex - 2bdenx - \frac{1}{9}be^2nx^3 + 2bdex\log(cx^n) - \frac{d^2(a+b\log(cx^n))}{x} + \frac{1}{3}e^2x^3(a+b\log(cx^n))$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((b*d^2*n)/x) + 2*a*d*e*x - 2*b*d*e*n*x - (b*e^2*n*x^3)/9 + 2*b*d*e*x*Log
[c*x^n] - (d^2*(a + b*Log[c*x^n]))/x + (e^2*x^3*(a + b*Log[c*x^n]))/3
```

3.192.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 81, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^2}dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int \left(-\frac{d^2}{x^2}+2ed+\frac{e^2x^2}{3}\right)dx-\frac{d^2(a+b\log(cx^n))}{x}+2dex(a+b\log(cx^n))+\frac{1}{3}e^2x^3(a+b\log(cx^n))$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{x}+2dex(a+b\log(cx^n))+\frac{1}{3}e^2x^3(a+b\log(cx^n))-bn\left(\frac{d^2}{x}+2dex+\frac{e^2x^3}{9}\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-(b*n*(d^2/x + 2*d*e*x + (e^2*x^3)/9)) - (d^2*(a + b*Log[c*x^n]))/x + 2*d*
e*x*(a + b*Log[c*x^n]) + (e^2*x^3*(a + b*Log[c*x^n]))/3
```

3.192.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.192.4 Maple [A] (verified)

Time = 0.78 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.16

method	result
parallelrisch	$-\frac{-3x^4 b \ln(c\,x^n) e^2+b\,e^2 n\,x^4-3x^4 a\,e^2-18b\ln(c\,x^n) de\,x^2+18bden\,x^2-18ade\,x^2+9b\ln(c\,x^n) d^2+9b\,d^2 n+9a\,d^2}{9x}$
risch	$-\frac{b(-e^2x^4-6de\,x^2+3d^2)\ln(x^n)}{3x}-\frac{-18i\pi bde\,x^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2-9i\pi b\,d^2\,\mathrm{csgn}(ic\,x^n)^3+9i\pi b\,d^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2-}{}$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-1/9/x*(-3*x^4*b*ln(c*x^n)*e^2+b*e^2*n*x^4-3*x^4*a*e^2-18*b*ln(c*x^n)*d*e*
x^2+18*b*d*e*n*x^2-18*a*d*e*x^2+9*b*ln(c*x^n)*d^2+9*b*d^2*n+9*a*d^2)
```

3.192.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.31

$$\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x^2}\,dx =$$
$$-\frac{(be^2n-3\,ae^2)x^4+9\,bd^2n+9\,ad^2+18\,(bden-ade)x^2-3\,(be^2x^4+6\,bdex^2-3\,bd^2)\log(c)-3\,(be^2nx^4}{9\,x}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
-1/9*((b*e^2*n - 3*a*e^2)*x^4 + 9*b*d^2*n + 9*a*d^2 + 18*(b*d*e*n - a*d*e)
*x^2 - 3*(b*e^2*x^4 + 6*b*d*e*x^2 - 3*b*d^2)*log(c) - 3*(b*e^2*n*x^4 + 6*b
*d*e*n*x^2 - 3*b*d^2*n)*log(x))/x
```

3.192.6 Sympy [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x^2}\,dx = -\frac{ad^2}{x}+2adex+\frac{ae^2x^3}{3}-\frac{bd^2n}{x}-\frac{bd^2\log(cx^n)}{x}$$
$$-2bdenx+2bdex\log(cx^n)-\frac{be^2nx^3}{9}+\frac{be^2x^3\log(cx^n)}{3}$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**2,x)
```

output
```
-a*d**2/x + 2*a*d*e*x + a*e**2*x**3/3 - b*d**2*n/x - b*d**2*log(c*x**n)/x
- 2*b*d*e*n*x + 2*b*d*e*x*log(c*x**n) - b*e**2*n*x**3/9 + b*e**2*x**3*log(
c*x**n)/3
```

3.192.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^2}\,dx = -\frac{1}{9}\,be^2nx^3 + \frac{1}{3}\,be^2x^3\log(cx^n) + \frac{1}{3}\,ae^2x^3 - 2\,bdenx + 2\,bdex\log(cx^n) + 2\,adex - \frac{bd^2n}{x} - \frac{bd^2\log(cx^n)}{x} - \frac{ad^2}{x}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
-1/9*b*e^2*n*x^3 + 1/3*b*e^2*x^3*log(c*x^n) + 1/3*a*e^2*x^3 - 2*b*d*e*n*x
+ 2*b*d*e*x*log(c*x^n) + 2*a*d*e*x - b*d^2*n/x - b*d^2*log(c*x^n)/x - a*d^
2/x
```

3.192.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.24

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^2}\,dx = -\frac{1}{9}\,(be^2n - 3\,be^2\log(c) - 3\,ae^2)x^3 - 2\,(bden - bde\log(c) - ade)x + \frac{1}{3}\left(be^2nx^3 + 6\,bdenx - \frac{3\,bd^2n}{x}\right)\log(x) - \frac{bd^2n + bd^2\log(c) + ad^2}{x}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
-1/9*(b*e^2*n - 3*b*e^2*log(c) - 3*a*e^2)*x^3 - 2*(b*d*e*n - b*d*e*log(c)
- a*d*e)*x + 1/3*(b*e^2*n*x^3 + 6*b*d*e*n*x - 3*b*d^2*n/x)*log(x) - (b*d^2
*n + b*d^2*log(c) + a*d^2)/x
```

3.192.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 102, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^2} dx = \ln(c\,x^n) \left(\frac{\frac{4\,b\,e^2\,x^4}{3}+4\,b\,d\,e\,x^2}{x}-\frac{b\,d^2+2\,b\,d\,e\,x^2+b\,e^2\,x^4}{x}\right) - \frac{a\,d^2+b\,d^2\,n}{x}+\frac{e^2\,x^3\,(3\,a-b\,n)}{9}+2\,d\,e\,x\,(a-b\,n)$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^2,x)
```

output
```
log(c*x^n)*(((4*b*e^2*x^4)/3 + 4*b*d*e*x^2)/x - (b*d^2 + b*e^2*x^4 + 2*b*d
*e*x^2)/x) - (a*d^2 + b*d^2*n)/x + (e^2*x^3*(3*a - b*n))/9 + 2*d*e*x*(a -
b*n)
```

3.193 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^4} dx$

3.193.1 Optimal result

Integrand size = 23, antiderivative size = 82

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^4} dx = -\frac{bd^2n}{9x^3} - \frac{2bden}{x} - be^2nx - \frac{d^2(a+b\log(cx^n))}{3x^3} - \frac{2de(a+b\log(cx^n))}{x} + e^2x(a+b\log(cx^n))$$

output
```
-1/9*b*d^2*n/x^3-2*b*d*e*n/x-b*e^2*n*x-1/3*d^2*(a+b*ln(c*x^n))/x^3-2*d*e*(
a+b*ln(c*x^n))/x+e^2*x*(a+b*ln(c*x^n))
```

3.193.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.98

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^4} dx = -\frac{3a(d^2+6dex^2-3e^2x^4)+bn(d^2+18dex^2+9e^2x^4)+3b(d^2+6dex^2-3e^2x^4)\log(cx^n)}{9x^3}$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/9*(3*a*(d^2 + 6*d*e*x^2 - 3*e^2*x^4) + b*n*(d^2 + 18*d*e*x^2 + 9*e^2*x^
4) + 3*b*(d^2 + 6*d*e*x^2 - 3*e^2*x^4)*Log[c*x^n])/x^3
```

3.193.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^4} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(-\frac{d^2}{3x^4}-\frac{2ed}{x^2}+e^2\right)dx-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2de(a+b\log(cx^n))}{x}+e^2x(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2de(a+b\log(cx^n))}{x}+e^2x(a+b\log(cx^n))-bn\left(\frac{d^2}{9x^3}+\frac{2de}{x}+e^2x\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-(b*n*(d^2/(9*x^3) + (2*d*e)/x + e^2*x)) - (d^2*(a + b*Log[c*x^n]))/(3*x^3
) - (2*d*e*(a + b*Log[c*x^n]))/x + e^2*x*(a + b*Log[c*x^n])
```

3.193.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.193.4 Maple [A] (verified)

Time = 0.47 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.17

method	result
parallelrisch	$-\frac{-9x^4 b\ln(c\,x^n)e^2+9b\,e^2n\,x^4-9x^4a\,e^2+18b\ln(c\,x^n)de\,x^2+18bden\,x^2+18ade\,x^2+3b\ln(c\,x^n)d^2+b\,d^2n+3a\,d^2}{9x^3}$
risch	$-\frac{b(-3e^2x^4+6de\,x^2+d^2)\ln(x^n)}{3x^3}-\frac{-9i\pi b\,e^2x^4\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2+3i\pi b\,d^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2-18i\pi bde\,x^2\,\mathrm{csgn}(ic\,x^n)^3}{}$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/9/x^3*(-9*x^4*b*ln(c*x^n)*e^2+9*b*e^2*n*x^4-9*x^4*a*e^2+18*b*ln(c*x^n)*
d*e*x^2+18*b*d*e*n*x^2+18*a*d*e*x^2+3*b*ln(c*x^n)*d^2+b*d^2*n+3*a*d^2)
```

3.193.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.34

$$\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{9\,(be^2n-ae^2)x^4+bd^2n+3\,ad^2+18\,(bden+ade)x^2-3\,(3\,be^2x^4-6\,bdex^2-bd^2)\log(c)-3\,(3\,be^2nx^4}{9\,x^3}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/9*(9*(b*e^2*n - a*e^2)*x^4 + b*d^2*n + 3*a*d^2 + 18*(b*d*e*n + a*d*e)*x
^2 - 3*(3*b*e^2*x^4 - 6*b*d*e*x^2 - b*d^2)*log(c) - 3*(3*b*e^2*n*x^4 - 6*b
*d*e*n*x^2 - b*d^2*n)*log(x))/x^3
```

3.193.6 Sympy [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.22

$$\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{ad^2}{3x^3}-\frac{2ade}{x}+ae^2x-\frac{bd^2n}{9x^3}-\frac{bd^2\log(cx^n)}{3x^3}-\frac{2bden}{x}-\frac{2bde\log(cx^n)}{x}-be^2nx+be^2x\log(cx^n)$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d**2/(3*x**3) - 2*a*d*e/x + a*e**2*x - b*d**2*n/(9*x**3) - b*d**2*log(c
*x**n)/(3*x**3) - 2*b*d*e*n/x - 2*b*d*e*log(c*x**n)/x - b*e**2*n*x + b*e**
2*x*log(c*x**n)
```

3.193.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 92, normalized size of antiderivative = 1.12

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^4}\,dx = -be^2nx + be^2x\log(cx^n) + ae^2x - \frac{2\,bden}{x} - \frac{2\,bde\log(cx^n)}{x} - \frac{2\,ade}{x} - \frac{bd^2n}{9\,x^3} - \frac{bd^2\log(cx^n)}{3\,x^3} - \frac{ad^2}{3\,x^3}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
-b*e^2*n*x + b*e^2*x*log(c*x^n) + a*e^2*x - 2*b*d*e*n/x - 2*b*d*e*log(c*x^
n)/x - 2*a*d*e/x - 1/9*b*d^2*n/x^3 - 1/3*b*d^2*log(c*x^n)/x^3 - 1/3*a*d^2/
x^3
```

3.193.8 Giac [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.37

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^4}\,dx = -(be^2n - be^2\log(c) - ae^2)x + \frac{1}{3}\left(3\,be^2nx - \frac{6\,bdenx^2 + bd^2n}{x^3}\right)\log(x) - \frac{18\,bdenx^2 + 18\,bdex^2\log(c) + 18\,adex^2 + bd^2n + 3\,bd^2\log(c) + 3\,ad^2}{9\,x^3}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
-(b*e^2*n - b*e^2*log(c) - a*e^2)*x + 1/3*(3*b*e^2*n*x - (6*b*d*e*n*x^2 +
b*d^2*n)/x^3)*log(x) - 1/9*(18*b*d*e*n*x^2 + 18*b*d*e*x^2*log(c) + 18*a*d*
e*x^2 + b*d^2*n + 3*b*d^2*log(c) + 3*a*d^2)/x^3
```

3.193.9 Mupad [B] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^4} \, dx = e^2 x (a-bn) - \frac{x^2 (6ade + 6bden) + ad^2 + \frac{bd^2n}{3}}{3x^3} - \ln(cx^n) \left(\frac{\frac{bd^2}{3} + 2bdex^2 + \frac{5be^2x^4}{3}}{x^3} - \frac{8be^2x}{3} \right)$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^4,x)
```

output
```
e^2*x*(a - b*n) - (x^2*(6*a*d*e + 6*b*d*e*n) + a*d^2 + (b*d^2*n)/3)/(3*x^3
) - log(c*x^n)*(((b*d^2)/3 + (5*b*e^2*x^4)/3 + 2*b*d*e*x^2)/x^3 - (8*b*e^2
*x)/3)
```

3.194 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^6}\,dx$

3.194.1 Optimal result

Integrand size = 23, antiderivative size = 91

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^6}\,dx = -\frac{bd^2n}{25x^5}-\frac{2bden}{9x^3}-\frac{be^2n}{x}-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{x}$$

output
```
-1/25*b*d^2*n/x^5-2/9*b*d*e*n/x^3-b*e^2*n/x-1/5*d^2*(a+b*ln(c*x^n))/x^5-2/
3*d*e*(a+b*ln(c*x^n))/x^3-e^2*(a+b*ln(c*x^n))/x
```

3.194.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 86, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^6}\,dx = -\frac{15a(3d^2+10dex^2+15e^2x^4)+bn(9d^2+50dex^2+225e^2x^4)+15b(3d^2+10dex^2+15e^2x^4)\log(cx^n)}{225x^5}$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/225*(15*a*(3*d^2 + 10*d*e*x^2 + 15*e^2*x^4) + b*n*(9*d^2 + 50*d*e*x^2 +
 225*e^2*x^4) + 15*b*(3*d^2 + 10*d*e*x^2 + 15*e^2*x^4)*Log[c*x^n])/x^5
```

3.194.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 92, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 1433, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^6}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{15e^2x^4+10dex^2+3d^2}{15x^6}dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{15}bn\int \frac{15e^2x^4+10dex^2+3d^2}{x^6}dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{1433}$$

$$\frac{1}{15}bn\int \left(\frac{3d^2}{x^6}+\frac{10ed}{x^4}+\frac{15e^2}{x^2}\right)dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2de(a+b\log(cx^n))}{3x^3}-\frac{e^2(a+b\log(cx^n))}{x}+\frac{1}{15}bn\left(-\frac{3d^2}{5x^5}-\frac{10de}{3x^3}-\frac{15e^2}{x}\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*((-3*d^2)/(5*x^5) - (10*d*e)/(3*x^3) - (15*e^2)/x))/15 - (d^2*(a + b*
Log[c*x^n]))/(5*x^5) - (2*d*e*(a + b*Log[c*x^n]))/(3*x^3) - (e^2*(a + b*Lo
g[c*x^n]))/x
```

3.194.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1433
```
Int[((d_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol]
 :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a,
b, c, d, m}, x] && IGtQ[p, 0] && (EqQ[p, 1] ||  !IntegerQ[(m + 1)/2])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.194.4 Maple [A] (verified)

Time = 0.48 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.07

method	result
parallelrisch	$-\frac{225x^4 b\ln(c\,x^n)e^2+225b\,e^2 n\,x^4+225x^4 a\,e^2+150b\ln(c\,x^n)de\,x^2+50bden\,x^2+150ade\,x^2+45b\ln(c\,x^n)d^2+9b\,d^2 n+45a\,d^2}{225x^5}$
risch	$-\frac{b(15e^2x^4+10de\,x^2+3d^2)\ln(x^n)}{15x^5}-\frac{-150i\pi bde\,x^2\,\mathrm{csgn}(ic\,x^n)^3-225i\pi b\,e^2x^4\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)+45i\pi b\,d^2\,\mathrm{csgn}(}{}$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/225/x^5*(225*x^4*b*ln(c*x^n)*e^2+225*b*e^2*n*x^4+225*x^4*a*e^2+150*b*ln
(c*x^n)*d*e*x^2+50*b*d*e*n*x^2+150*a*d*e*x^2+45*b*ln(c*x^n)*d^2+9*b*d^2*n+
45*a*d^2)
```

3.194.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 111, normalized size of antiderivative = 1.22

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^6}\,dx = -\frac{225\,(be^2n+ae^2)x^4+9\,bd^2n+45\,ad^2+50\,(bden+3\,ade)x^2+15\,(15\,be^2x^4+10\,bdex^2+3\,bd^2)\log(c)+}{225\,x^5}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/225*(225*(b*e^2*n + a*e^2)*x^4 + 9*b*d^2*n + 45*a*d^2 + 50*(b*d*e*n + 3
*a*d*e)*x^2 + 15*(15*b*e^2*x^4 + 10*b*d*e*x^2 + 3*b*d^2)*log(c) + 15*(15*b
*e^2*n*x^4 + 10*b*d*e*n*x^2 + 3*b*d^2*n)*log(x))/x^5
```

3.194.6 Sympy [A] (verification not implemented)

Time = 0.57 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^6}\,dx = -\frac{ad^2}{5x^5}-\frac{2ade}{3x^3}-\frac{ae^2}{x}-\frac{bd^2n}{25x^5}-\frac{bd^2\log(cx^n)}{5x^5} -\frac{2bden}{9x^3}-\frac{2bde\log(cx^n)}{3x^3}-\frac{be^2n}{x}-\frac{be^2\log(cx^n)}{x}$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**6,x)
```

output
```
-a*d**2/(5*x**5) - 2*a*d*e/(3*x**3) - a*e**2/x - b*d**2*n/(25*x**5) - b*d*
*2*log(c*x**n)/(5*x**5) - 2*b*d*e*n/(9*x**3) - 2*b*d*e*log(c*x**n)/(3*x**3
) - b*e**2*n/x - b*e**2*log(c*x**n)/x
```

3.194.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^6}\,dx = -\frac{be^2n}{x}-\frac{be^2\log(cx^n)}{x}-\frac{ae^2}{x}-\frac{2\,bden}{9\,x^3}-\frac{2\,bde\log(cx^n)}{3\,x^3} -\frac{2\,ade}{3\,x^3}-\frac{bd^2n}{25\,x^5}-\frac{bd^2\log(cx^n)}{5\,x^5}-\frac{ad^2}{5\,x^5}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
-b*e^2*n/x - b*e^2*log(c*x^n)/x - a*e^2/x - 2/9*b*d*e*n/x^3 - 2/3*b*d*e*lo
g(c*x^n)/x^3 - 2/3*a*d*e/x^3 - 1/25*b*d^2*n/x^5 - 1/5*b*d^2*log(c*x^n)/x^5
 - 1/5*a*d^2/x^5
```

3.194.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 119, normalized size of antiderivative = 1.31

$$\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x^6}\,dx = -\frac{(15\,be^2nx^4+10\,bdenx^2+3\,bd^2n)\log(x)}{15\,x^5} - \frac{225\,be^2nx^4+225\,be^2x^4\log(c)+225\,ae^2x^4+50\,bdenx^2+150\,bdex^2\log(c)+150\,adex^2+9\,bd^2n+45\,b}{225\,x^5}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
-1/15*(15*b*e^2*n*x^4 + 10*b*d*e*n*x^2 + 3*b*d^2*n)*log(x)/x^5 - 1/225*(22
5*b*e^2*n*x^4 + 225*b*e^2*x^4*log(c) + 225*a*e^2*x^4 + 50*b*d*e*n*x^2 + 15
0*b*d*e*x^2*log(c) + 150*a*d*e*x^2 + 9*b*d^2*n + 45*b*d^2*log(c) + 45*a*d^
2)/x^5
```

3.194.9 Mupad [B] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 88, normalized size of antiderivative = 0.97

$$\int \frac{(d+ex^2)^2\,(a+b\log(cx^n))}{x^6}\,dx = -\frac{x^4\,(15\,a\,e^2+15\,b\,e^2\,n)+x^2\,\left(10\,a\,d\,e+\frac{10\,b\,d\,e\,n}{3}\right)+3\,a\,d^2+\frac{3\,b\,d^2\,n}{5}}{15\,x^5} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d^2}{5}+\frac{2\,b\,d\,e\,x^2}{3}+b\,e^2\,x^4\right)}{x^5}$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^6,x)
```

output
```
- (x^4*(15*a*e^2 + 15*b*e^2*n) + x^2*(10*a*d*e + (10*b*d*e*n)/3) + 3*a*d^2
 + (3*b*d^2*n)/5)/(15*x^5) - (log(c*x^n)*((b*d^2)/5 + b*e^2*x^4 + (2*b*d*e
*x^2)/3))/x^5
```

3.195 $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^8}\,dx$

3.195.1 Optimal result

Integrand size = 23, antiderivative size = 95

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^2n}{49x^7}-\frac{2bden}{25x^5}-\frac{be^2n}{9x^3}-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2de(a+b\log(cx^n))}{5x^5}-\frac{e^2(a+b\log(cx^n))}{3x^3}$$

output
```
-1/49*b*d^2*n/x^7-2/25*b*d*e*n/x^5-1/9*b*e^2*n/x^3-1/7*d^2*(a+b*ln(c*x^n))
/x^7-2/5*d*e*(a+b*ln(c*x^n))/x^5-1/3*e^2*(a+b*ln(c*x^n))/x^3
```

3.195.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 95, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^2n}{49x^7}-\frac{2bden}{25x^5}-\frac{be^2n}{9x^3}-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2de(a+b\log(cx^n))}{5x^5}-\frac{e^2(a+b\log(cx^n))}{3x^3}$$

input
```
Integrate[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
-1/49*(b*d^2*n)/x^7 - (2*b*d*e*n)/(25*x^5) - (b*e^2*n)/(9*x^3) - (d^2*(a +
 b*Log[c*x^n]))/(7*x^7) - (2*d*e*(a + b*Log[c*x^n]))/(5*x^5) - (e^2*(a + b
*Log[c*x^n]))/(3*x^3)
```

3.195.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 1433, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^8} \, dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int -\frac{35e^2x^4+42dex^2+15d^2}{105x^8}dx-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2de(a+b\log(cx^n))}{5x^5}-\frac{e^2(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{105}bn\int \frac{35e^2x^4+42dex^2+15d^2}{x^8}dx-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2de(a+b\log(cx^n))}{5x^5}-\frac{e^2(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{ 1433}$$

$$\frac{1}{105}bn\int \left(\frac{15d^2}{x^8}+\frac{42ed}{x^6}+\frac{35e^2}{x^4}\right)dx-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2de(a+b\log(cx^n))}{5x^5}-\frac{e^2(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2de(a+b\log(cx^n))}{5x^5}-\frac{e^2(a+b\log(cx^n))}{3x^3}+\frac{1}{105}bn\left(-\frac{15d^2}{7x^7}-\frac{42de}{5x^5}-\frac{35e^2}{3x^3}\right)$$

input
```
Int[((d + e*x^2)^2*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*((-15*d^2)/(7*x^7) - (42*d*e)/(5*x^5) - (35*e^2)/(3*x^3)))/105 - (d^2
*(a + b*Log[c*x^n]))/(7*x^7) - (2*d*e*(a + b*Log[c*x^n]))/(5*x^5) - (e^2*(
a + b*Log[c*x^n]))/(3*x^3)
```

3.195.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1433
```
Int[((d_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol]
 :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a,
b, c, d, m}, x] && IGtQ[p, 0] && (EqQ[p, 1] ||  !IntegerQ[(m + 1)/2])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.195.4 Maple [A] (verified)

Time = 0.47 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.02

method	result
parallelrisch	$-\frac{3675x^4 b\ln(c\,x^n)e^2+1225b\,e^2 n\,x^4+3675x^4 a\,e^2+4410b\ln(c\,x^n)de\,x^2+882bden\,x^2+4410ade\,x^2+1575b\ln(c\,x^n)d^2+225b\,d^2n+}{11025x^7}$
risch	$-\frac{b(35e^2x^4+42de\,x^2+15d^2)\ln(x^n)}{105x^7} - \frac{-1575i\pi b\,d^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)+1575i\pi b\,d^2\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2-3675}{}$

input
```
int((e*x^2+d)^2*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

output
```
-1/11025/x^7*(3675*x^4*b*ln(c*x^n)*e^2+1225*b*e^2*n*x^4+3675*x^4*a*e^2+441
0*b*ln(c*x^n)*d*e*x^2+882*b*d*e*n*x^2+4410*a*d*e*x^2+1575*b*ln(c*x^n)*d^2+
225*b*d^2*n+1575*a*d^2)
```

3.195.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^8}\,dx = -\frac{1225\,(be^2n+3\,ae^2)x^4+225\,bd^2n+1575\,ad^2+882\,(bden+5\,ade)x^2+105\,(35\,be^2x^4+42\,bdex^2+15\,bc}{11025\,x^7}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

output
```
-1/11025*(1225*(b*e^2*n + 3*a*e^2)*x^4 + 225*b*d^2*n + 1575*a*d^2 + 882*(b
*d*e*n + 5*a*d*e)*x^2 + 105*(35*b*e^2*x^4 + 42*b*d*e*x^2 + 15*b*d^2)*log(c
) + 105*(35*b*e^2*n*x^4 + 42*b*d*e*n*x^2 + 15*b*d^2*n)*log(x))/x^7
```

3.195.6 Sympy [A] (verification not implemented)

Time = 0.95 (sec) , antiderivative size = 122, normalized size of antiderivative = 1.28

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^8}\,dx = -\frac{ad^2}{7x^7} - \frac{2ade}{5x^5} - \frac{ae^2}{3x^3} - \frac{bd^2n}{49x^7} - \frac{bd^2\log(cx^n)}{7x^7} - \frac{2bden}{25x^5} - \frac{2bde\log(cx^n)}{5x^5} - \frac{be^2n}{9x^3} - \frac{be^2\log(cx^n)}{3x^3}$$

input
```
integrate((e*x**2+d)**2*(a+b*ln(c*x**n))/x**8,x)
```

output
```
-a*d**2/(7*x**7) - 2*a*d*e/(5*x**5) - a*e**2/(3*x**3) - b*d**2*n/(49*x**7)
 - b*d**2*log(c*x**n)/(7*x**7) - 2*b*d*e*n/(25*x**5) - 2*b*d*e*log(c*x**n)
/(5*x**5) - b*e**2*n/(9*x**3) - b*e**2*log(c*x**n)/(3*x**3)
```

3.195.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.05

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^8}\,dx = -\frac{be^2n}{9\,x^3} - \frac{be^2\log(cx^n)}{3\,x^3} - \frac{ae^2}{3\,x^3} - \frac{2\,bden}{25\,x^5} - \frac{2\,bde\log(cx^n)}{5\,x^5} - \frac{2\,ade}{5\,x^5} - \frac{bd^2n}{49\,x^7} - \frac{bd^2\log(cx^n)}{7\,x^7} - \frac{ad^2}{7\,x^7}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

output
```
-1/9*b*e^2*n/x^3 - 1/3*b*e^2*log(c*x^n)/x^3 - 1/3*a*e^2/x^3 - 2/25*b*d*e*n
/x^5 - 2/5*b*d*e*log(c*x^n)/x^5 - 2/5*a*d*e/x^5 - 1/49*b*d^2*n/x^7 - 1/7*b
*d^2*log(c*x^n)/x^7 - 1/7*a*d^2/x^7
```

3.195.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 119, normalized size of antiderivative = 1.25

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^8}\,dx = -\frac{(35\,be^2nx^4+42\,bdenx^2+15\,bd^2n)\log(x)}{105\,x^7} - \frac{1225\,be^2nx^4+3675\,be^2x^4\log(c)+3675\,ae^2x^4+882\,bdenx^2+4410\,bdex^2\log(c)+4410\,adex^2+225\,bd}{11025\,x^7}$$

input
```
integrate((e*x^2+d)^2*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

output
```
-1/105*(35*b*e^2*n*x^4 + 42*b*d*e*n*x^2 + 15*b*d^2*n)*log(x)/x^7 - 1/11025
*(1225*b*e^2*n*x^4 + 3675*b*e^2*x^4*log(c) + 3675*a*e^2*x^4 + 882*b*d*e*n*
x^2 + 4410*b*d*e*x^2*log(c) + 4410*a*d*e*x^2 + 225*b*d^2*n + 1575*b*d^2*lo
g(c) + 1575*a*d^2)/x^7
```

3.195.9 Mupad [B] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 89, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex^2)^2 (a+b\log(cx^n))}{x^8}\,dx = -\frac{x^4\left(35\,a\,e^2+\frac{35\,b\,e^2\,n}{3}\right)+x^2\left(42\,a\,d\,e+\frac{42\,b\,d\,e\,n}{5}\right)+15\,a\,d^2+\frac{15\,b\,d^2\,n}{7}}{105\,x^7} - \frac{\ln(c\,x^n)\left(\frac{b\,d^2}{7}+\frac{2\,b\,d\,e\,x^2}{5}+\frac{b\,e^2\,x^4}{3}\right)}{x^7}$$

input
```
int(((d + e*x^2)^2*(a + b*log(c*x^n)))/x^8,x)
```

output
```
- (x^4*(35*a*e^2 + (35*b*e^2*n)/3) + x^2*(42*a*d*e + (42*b*d*e*n)/5) + 15*
a*d^2 + (15*b*d^2*n)/7)/(105*x^7) - (log(c*x^n)*((b*d^2)/7 + (b*e^2*x^4)/3
 + (2*b*d*e*x^2)/5))/x^7
```

3.195. $\int \frac{(d+ex^2)^2(a+b\log(cx^n))}{x^8}\,dx$

3.196 $\int x^5(d+ex^2)^3(a+b\log(cx^n))\,dx$

3.196.1 Optimal result

Integrand size = 23, antiderivative size = 100

$$\int x^5(d+ex^2)^3(a+b\log(cx^n))\,dx = -\frac{1}{36}bd^3nx^6-\frac{3}{64}bd^2enx^8-\frac{3}{100}bde^2nx^{10} -\frac{1}{144}be^3nx^{12}+\frac{1}{120}\left(20d^3x^6+45d^2ex^8+36de^2x^{10} +10e^3x^{12}\right)(a+b\log(cx^n))$$

output
```
-1/36*b*d^3*n*x^6-3/64*b*d^2*e*n*x^8-3/100*b*d*e^2*n*x^10-1/144*b*e^3*n*x^
12+1/120*(10*e^3*x^12+36*d*e^2*x^10+45*d^2*e*x^8+20*d^3*x^6)*(a+b*ln(c*x^n
))
```

3.196.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 120, normalized size of antiderivative = 1.20

$$\int x^5(d+ex^2)^3(a+b\log(cx^n))\,dx = \frac{x^6(120a(20d^3+45d^2ex^2+36de^2x^4+10e^3x^6)-bn(400d^3+675d^2ex^2+432de^2x^4+100e^3x^6)+120b(20a}{14400}$$

input
```
Integrate[x^5*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^6*(120*a*(20*d^3 + 45*d^2*e*x^2 + 36*d*e^2*x^4 + 10*e^3*x^6) - b*n*(400
*d^3 + 675*d^2*e*x^2 + 432*d*e^2*x^4 + 100*e^3*x^6) + 120*b*(20*d^3 + 45*d
^2*e*x^2 + 36*d*e^2*x^4 + 10*e^3*x^6)*Log[c*x^n]))/14400
```

3.196.3 Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 99, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5 \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{120}\left(20d^3x^6+45d^2ex^8+36de^2x^{10}+10e^3x^{12}\right)(a+b\log(cx^n))-bn\int \frac{1}{120}x^5\left(10e^3x^6+36de^2x^4+45d^2ex^2+20d^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{120}\left(20d^3x^6+45d^2ex^8+36de^2x^{10}+10e^3x^{12}\right)(a+b\log(cx^n))-\frac{1}{120}bn\int x^5\left(10e^3x^6+36de^2x^4+45d^2ex^2+20d^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{120}\left(20d^3x^6+45d^2ex^8+36de^2x^{10}+10e^3x^{12}\right)(a+b\log(cx^n))-\frac{1}{120}bn\int \left(10e^3x^{11}+36de^2x^9+45d^2ex^7+20d^3x^5\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{120}\left(20d^3x^6+45d^2ex^8+36de^2x^{10}+10e^3x^{12}\right)(a+b\log(cx^n))-\frac{1}{120}bn\left(\frac{10d^3x^6}{3}+\frac{45}{8}d^2ex^8+\frac{18}{5}de^2x^{10}+\frac{5e^3x^{12}}{6}\right)$$

input
```
Int[x^5*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/120*(b*n*((10*d^3*x^6)/3 + (45*d^2*e*x^8)/8 + (18*d*e^2*x^10)/5 + (5*e^
3*x^12)/6)) + ((20*d^3*x^6 + 45*d^2*e*x^8 + 36*d*e^2*x^10 + 10*e^3*x^12)*(
a + b*Log[c*x^n]))/120
```

3.196.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.196.4 Maple [A] (verified)

Time = 9.55 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.44

method	result
parallelrisch	$\frac{e^{3} b \ln\left(c \,x^{n}\right) x^{12}}{12}-\frac{b \,e^{3} n \,x^{12}}{144}+\frac{a \,e^{3} x^{12}}{12}+\frac{3 e^{2} d b \ln\left(c \,x^{n}\right) x^{10}}{10}-\frac{3 b d \,e^{2} n \,x^{10}}{100}+\frac{3 a d \,e^{2} x^{10}}{10}+\frac{3 e \,d^{2} b \ln\left(c \,x^{n}\right) x^{8}}{8}-\frac{3 b \,d^{2} e}{64}$
risch	$\frac{b \,x^{6} \left(10 e^{3} x^{6}+36 e^{2} d \,x^{4}+45 d^{2} e \,x^{2}+20 d^{3}\right) \ln\left(x^{n}\right)}{120}+\frac{a \,e^{3} x^{12}}{12}+\frac{a \,d^{3} x^{6}}{6}-\frac{3 i \pi b d \,e^{2} x^{10} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{20}+\frac{i \pi b \,e^{3} x^{12} \operatorname{csgn}\left(i c\right) \operatorname{csg}}{24}$

input
```
int(x^5*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/12*e^3*b*ln(c*x^n)*x^12-1/144*b*e^3*n*x^12+1/12*a*e^3*x^12+3/10*e^2*d*b*
ln(c*x^n)*x^10-3/100*b*d*e^2*n*x^10+3/10*a*d*e^2*x^10+3/8*e*d^2*b*ln(c*x^n
)*x^8-3/64*b*d^2*e*n*x^8+3/8*a*d^2*e*x^8+1/6*b*d^3*ln(c*x^n)*x^6-1/36*b*d^
3*n*x^6+1/6*a*d^3*x^6
```

3.196.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.67

$$\int x^5(d+ex^2)^3(a+b\log(cx^n))\,dx$$
$$= -\frac{1}{144}(be^3n-12\,ae^3)x^{12} - \frac{3}{100}(bde^2n-10\,ade^2)x^{10} - \frac{3}{64}(bd^2en-8\,ad^2e)x^8 - \frac{1}{36}(bd^3n-6\,ad^3)x^6 + \frac{1}{120}(10\,be^3x^{12}+36\,bde^2x^{10}+45\,bd^2ex^8+20\,bd^3x^6)\log(c) + \frac{1}{120}(10\,be^3nx^{12}+36\,bde^2nx^{10}+45\,bd^2enx^8+20\,bd^3nx^6)\log(x)$$

input
```
integrate(x^5*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/144*(b*e^3*n - 12*a*e^3)*x^12 - 3/100*(b*d*e^2*n - 10*a*d*e^2)*x^10 - 3
/64*(b*d^2*e*n - 8*a*d^2*e)*x^8 - 1/36*(b*d^3*n - 6*a*d^3)*x^6 + 1/120*(10
*b*e^3*x^12 + 36*b*d*e^2*x^10 + 45*b*d^2*e*x^8 + 20*b*d^3*x^6)*log(c) + 1/
120*(10*b*e^3*n*x^12 + 36*b*d*e^2*n*x^10 + 45*b*d^2*e*n*x^8 + 20*b*d^3*n*x
^6)*log(x)
```

3.196.6 Sympy [A] (verification not implemented)

Time = 2.96 (sec) , antiderivative size = 175, normalized size of antiderivative = 1.75

$$\int x^5(d+ex^2)^3(a+b\log(cx^n))\,dx = \frac{ad^3x^6}{6} + \frac{3ad^2ex^8}{8} + \frac{3ade^2x^{10}}{10} + \frac{ae^3x^{12}}{12} - \frac{bd^3nx^6}{36} + \frac{bd^3x^6\log(cx^n)}{6} - \frac{3bd^2enx^8}{64} + \frac{3bd^2ex^8\log(cx^n)}{8} - \frac{3bde^2nx^{10}}{100} + \frac{3bde^2x^{10}\log(cx^n)}{10} - \frac{be^3nx^{12}}{144} + \frac{be^3x^{12}\log(cx^n)}{12}$$

input
```
integrate(x**5*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**6/6 + 3*a*d**2*e*x**8/8 + 3*a*d*e**2*x**10/10 + a*e**3*x**12/12
- b*d**3*n*x**6/36 + b*d**3*x**6*log(c*x**n)/6 - 3*b*d**2*e*n*x**8/64 + 3*
b*d**2*e*x**8*log(c*x**n)/8 - 3*b*d*e**2*n*x**10/100 + 3*b*d*e**2*x**10*lo
g(c*x**n)/10 - b*e**3*n*x**12/144 + b*e**3*x**12*log(c*x**n)/12
```

3.196.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.43

$$\int x^5 (d+ex^2)^3 (a+b\log(cx^n))\, dx = -\frac{1}{144}\, be^3nx^{12} + \frac{1}{12}\, be^3x^{12}\log(cx^n) + \frac{1}{12}\, ae^3x^{12} - \frac{3}{100}\, bde^2nx^{10} + \frac{3}{10}\, bde^2x^{10}\log(cx^n) + \frac{3}{10}\, ade^2x^{10} - \frac{3}{64}\, bd^2enx^8 + \frac{3}{8}\, bd^2ex^8\log(cx^n) + \frac{3}{8}\, ad^2ex^8 - \frac{1}{36}\, bd^3nx^6 + \frac{1}{6}\, bd^3x^6\log(cx^n) + \frac{1}{6}\, ad^3x^6$$

input
```
integrate(x^5*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/144*b*e^3*n*x^12 + 1/12*b*e^3*x^12*log(c*x^n) + 1/12*a*e^3*x^12 - 3/100
*b*d*e^2*n*x^10 + 3/10*b*d*e^2*x^10*log(c*x^n) + 3/10*a*d*e^2*x^10 - 3/64*
b*d^2*e*n*x^8 + 3/8*b*d^2*e*x^8*log(c*x^n) + 3/8*a*d^2*e*x^8 - 1/36*b*d^3*
n*x^6 + 1/6*b*d^3*x^6*log(c*x^n) + 1/6*a*d^3*x^6
```

3.196.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.77

$$\int x^5 (d+ex^2)^3 (a+b\log(cx^n))\, dx = \frac{1}{12}\, be^3nx^{12}\log(x) - \frac{1}{144}\, be^3nx^{12} + \frac{1}{12}\, be^3x^{12}\log(c) + \frac{1}{12}\, ae^3x^{12} + \frac{3}{10}\, bde^2nx^{10}\log(x) - \frac{3}{100}\, bde^2nx^{10} + \frac{3}{10}\, bde^2x^{10}\log(c) + \frac{3}{10}\, ade^2x^{10} + \frac{3}{8}\, bd^2enx^8\log(x) - \frac{3}{64}\, bd^2enx^8 + \frac{3}{8}\, bd^2ex^8\log(c) + \frac{3}{8}\, ad^2ex^8 + \frac{1}{6}\, bd^3nx^6\log(x) - \frac{1}{36}\, bd^3nx^6 + \frac{1}{6}\, bd^3x^6\log(c) + \frac{1}{6}\, ad^3x^6$$

input
```
integrate(x^5*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/12*b*e^3*n*x^12*log(x) - 1/144*b*e^3*n*x^12 + 1/12*b*e^3*x^12*log(c) + 1
/12*a*e^3*x^12 + 3/10*b*d*e^2*n*x^10*log(x) - 3/100*b*d*e^2*n*x^10 + 3/10*
b*d*e^2*x^10*log(c) + 3/10*a*d*e^2*x^10 + 3/8*b*d^2*e*n*x^8*log(x) - 3/64*
b*d^2*e*n*x^8 + 3/8*b*d^2*e*x^8*log(c) + 3/8*a*d^2*e*x^8 + 1/6*b*d^3*n*x^6
*log(x) - 1/36*b*d^3*n*x^6 + 1/6*b*d^3*x^6*log(c) + 1/6*a*d^3*x^6
```

3.196.9 Mupad [B] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.13

$$\int x^5\left(d+ex^2\right)^3(a+b\log(cx^n))\,dx=\ln(c\,x^n)\left(\frac{b\,d^3\,x^6}{6}+\frac{3\,b\,d^2\,e\,x^8}{8}+\frac{3\,b\,d\,e^2\,x^{10}}{10}+\frac{b\,e^3\,x^{12}}{12}\right)+\frac{d^3\,x^6\,(6\,a-b\,n)}{36}+\frac{e^3\,x^{12}\,(12\,a-b\,n)}{144}+\frac{3\,d^2\,e\,x^8\,(8\,a-b\,n)}{64}+\frac{3\,d\,e^2\,x^{10}\,(10\,a-b\,n)}{100}$$

input
```
int(x^5*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^3*x^6)/6 + (b*e^3*x^12)/12 + (3*b*d^2*e*x^8)/8 + (3*b*d*e
^2*x^10)/10) + (d^3*x^6*(6*a - b*n))/36 + (e^3*x^12*(12*a - b*n))/144 + (3
*d^2*e*x^8*(8*a - b*n))/64 + (3*d*e^2*x^10*(10*a - b*n))/100
```

3.197 $\int x^3(d+ex^2)^3(a+b\log(cx^n))\,dx$

3.197.1 Optimal result

Integrand size = 23, antiderivative size = 130

$$\int x^3(d+ex^2)^3(a+b\log(cx^n))\,dx=\frac{bd^4nx^2}{20e}+\frac{3}{80}bd^3nx^4+\frac{1}{60}bd^2enx^6+\frac{1}{320}bde^2nx^8-\frac{bn(d+ex^2)^5}{100e^2}+\frac{bd^5n\log(x)}{40e^2}-\frac{1}{40}\left(\frac{5d(d+ex^2)^4}{e^2}-\frac{4(d+ex^2)^5}{e^2}\right)(a+b\log(cx^n))$$

output
```
1/20*b*d^4*n*x^2/e+3/80*b*d^3*n*x^4+1/60*b*d^2*e*n*x^6+1/320*b*d*e^2*n*x^8
-1/100*b*n*(e*x^2+d)^5/e^2+1/40*b*d^5*n*ln(x)/e^2-1/40*(5*d*(e*x^2+d)^4/e^
2-4*(e*x^2+d)^5/e^2)*(a+b*ln(c*x^n))
```

3.197.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 120, normalized size of antiderivative = 0.92

$$\int x^3(d+ex^2)^3(a+b\log(cx^n))\,dx=\frac{x^4(120a(10d^3+20d^2ex^2+15de^2x^4+4e^3x^6)-bn(300d^3+400d^2ex^2+225de^2x^4+48e^3x^6)+120b(10d^3 \cdots}{4800}$$

input
```
Integrate[x^3*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(120*a*(10*d^3 + 20*d^2*e*x^2 + 15*d*e^2*x^4 + 4*e^3*x^6) - b*n*(300*
d^3 + 400*d^2*e*x^2 + 225*d*e^2*x^4 + 48*e^3*x^6) + 120*b*(10*d^3 + 20*d^2
*e*x^2 + 15*d*e^2*x^4 + 4*e^3*x^6)*Log[c*x^n]))/4800
```

3.197.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 120, normalized size of antiderivative = 0.92, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.261, Rules used = {2771, 27, 354, 90, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \text{2771}$$

$$-bn\int -\frac{\left(d-4ex^2\right)\left(ex^2+d\right)^4}{40e^2x}dx-\frac{1}{40}\left(\frac{5d\left(d+ex^2\right)^4}{e^2}-\frac{4\left(d+ex^2\right)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{\left(d-4ex^2\right)\left(ex^2+d\right)^4}{x}dx}{40e^2}-\frac{1}{40}\left(\frac{5d\left(d+ex^2\right)^4}{e^2}-\frac{4\left(d+ex^2\right)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)$$

$$\Big\downarrow \text{354}$$

$$\frac{bn\int \frac{\left(d-4ex^2\right)\left(ex^2+d\right)^4}{x^2}dx^2}{80e^2}-\frac{1}{40}\left(\frac{5d\left(d+ex^2\right)^4}{e^2}-\frac{4\left(d+ex^2\right)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)$$

$$\Big\downarrow \text{90}$$

$$\frac{bn\left(d\int \frac{\left(ex^2+d\right)^4}{x^2}dx^2-\frac{4}{5}\left(d+ex^2\right)^5\right)}{80e^2}-\frac{1}{40}\left(\frac{5d\left(d+ex^2\right)^4}{e^2}-\frac{4\left(d+ex^2\right)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)$$

$$\Big\downarrow \text{49}$$

$$\frac{bn\left(d\int \left(e^4x^6+4de^3x^4+6d^2e^2x^2+4d^3e+\frac{d^4}{x^2}\right)dx^2-\frac{4}{5}\left(d+ex^2\right)^5\right)}{80e^2}-\frac{1}{40}\left(\frac{5d\left(d+ex^2\right)^4}{e^2}-\frac{4\left(d+ex^2\right)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(d\left(d^4\log\left(x^2\right)+4d^3ex^2+3d^2e^2x^4+\frac{4}{3}de^3x^6+\frac{e^4x^8}{4}\right)-\frac{4}{5}\left(d+ex^2\right)^5\right)}{80e^2}-\frac{1}{40}\left(\frac{5d\left(d+ex^2\right)^4}{e^2}-\frac{4\left(d+ex^2\right)^5}{e^2}\right)\left(a+b\log\left(cx^n\right)\right)$$

input
```
Int[x^3*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
(b*n*((-4*(d + e*x^2)^5)/5 + d*(4*d^3*e*x^2 + 3*d^2*e^2*x^4 + (4*d*e^3*x^6
)/3 + (e^4*x^8)/4 + d^4*Log[x^2])))/(80*e^2) - (((5*d*(d + e*x^2)^4)/e^2 -
 (4*(d + e*x^2)^5)/e^2)*(a + b*Log[c*x^n]))/40
```

3.197.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.197.4 Maple [A] (verified)

Time = 1.32 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.11

method	result
parallelrisch	$\frac{x^{10} \ln(c\,x^n) b\,e^3}{10}-\frac{b\,e^3 n\,x^{10}}{100}+\frac{a\,e^3 x^{10}}{10}+\frac{3x^8 \ln(c\,x^n) bd\,e^2}{8}-\frac{3bd\,e^2 n\,x^8}{64}+\frac{3ad\,e^2 x^8}{8}+\frac{x^6 \ln(c\,x^n) b\,d^2 e}{2}-\frac{b\,d^2 en\,x^6}{12}$
risch	$\frac{a\,e^3 x^{10}}{10}+\frac{a\,d^3 x^4}{4}+\frac{i\pi b\,e^3 x^{10}\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2}{20}-\frac{3i\pi bd\,e^2 x^8\operatorname{csgn}(ic\,x^n)^3}{16}+\frac{i\pi b\,d^2 e\,x^6\operatorname{csgn}(ic)\operatorname{csgn}(ic\,x^n)^2}{4}+$

input
```
int(x^3*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/10*x^10*ln(c*x^n)*b*e^3-1/100*b*e^3*n*x^10+1/10*a*e^3*x^10+3/8*x^8*ln(c*
x^n)*b*d*e^2-3/64*b*d*e^2*n*x^8+3/8*a*d*e^2*x^8+1/2*x^6*ln(c*x^n)*b*d^2*e-
1/12*b*d^2*e*n*x^6+1/2*a*d^2*e*x^6+1/4*x^4*ln(c*x^n)*b*d^3-1/16*b*d^3*n*x^
4+1/4*a*d^3*x^4
```

3.197.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.28

$$\begin{aligned}\int x^3 (d+ex^2)^3 (a+b\log(cx^n))\,dx &= -\frac{1}{100}\,(be^3n-10\,ae^3)x^{10}-\frac{3}{64}\,(bde^2n-8\,ade^2)x^8-\frac{1}{12}\,(bd^2en-6\,ad^2e)x^6\\ &\quad-\frac{1}{16}\,(bd^3n-4\,ad^3)x^4+\frac{1}{40}\,(4\,be^3x^{10}+15\,bde^2x^8+20\,bd^2ex^6+10\,bd^3x^4)\log(c)\\ &\quad+\frac{1}{40}\,(4\,be^3nx^{10}+15\,bde^2nx^8+20\,bd^2enx^6+10\,bd^3nx^4)\log(x)\end{aligned}$$

input
```
integrate(x^3*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/100*(b*e^3*n - 10*a*e^3)*x^10 - 3/64*(b*d*e^2*n - 8*a*d*e^2)*x^8 - 1/12
*(b*d^2*e*n - 6*a*d^2*e)*x^6 - 1/16*(b*d^3*n - 4*a*d^3)*x^4 + 1/40*(4*b*e^
3*x^10 + 15*b*d*e^2*x^8 + 20*b*d^2*e*x^6 + 10*b*d^3*x^4)*log(c) + 1/40*(4*
b*e^3*n*x^10 + 15*b*d*e^2*n*x^8 + 20*b*d^2*e*n*x^6 + 10*b*d^3*n*x^4)*log(x
)
```

3.197.6 Sympy [A] (verification not implemented)

Time = 1.73 (sec) , antiderivative size = 170, normalized size of antiderivative = 1.31

$$\int x^3(d+ex^2)^3(a+b\log(cx^n))\,dx = \frac{ad^3x^4}{4} + \frac{ad^2ex^6}{2} + \frac{3ade^2x^8}{8} + \frac{ae^3x^{10}}{10} - \frac{bd^3nx^4}{16} + \frac{bd^3x^4\log(cx^n)}{4} - \frac{bd^2enx^6}{12} + \frac{bd^2ex^6\log(cx^n)}{2} - \frac{3bde^2nx^8}{64} + \frac{3bde^2x^8\log(cx^n)}{8} - \frac{be^3nx^{10}}{100} + \frac{be^3x^{10}\log(cx^n)}{10}$$

input
```
integrate(x**3*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**4/4 + a*d**2*e*x**6/2 + 3*a*d*e**2*x**8/8 + a*e**3*x**10/10 - b*
d**3*n*x**4/16 + b*d**3*x**4*log(c*x**n)/4 - b*d**2*e*n*x**6/12 + b*d**2*e
*x**6*log(c*x**n)/2 - 3*b*d*e**2*n*x**8/64 + 3*b*d*e**2*x**8*log(c*x**n)/8
 - b*e**3*n*x**10/100 + b*e**3*x**10*log(c*x**n)/10
```

3.197.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.10

$$\int x^3(d+ex^2)^3(a+b\log(cx^n))\,dx = -\frac{1}{100}be^3nx^{10} + \frac{1}{10}be^3x^{10}\log(cx^n) + \frac{1}{10}ae^3x^{10} - \frac{3}{64}bde^2nx^8 + \frac{3}{8}bde^2x^8\log(cx^n) + \frac{3}{8}ade^2x^8 - \frac{1}{12}bd^2enx^6 + \frac{1}{2}bd^2ex^6\log(cx^n) + \frac{1}{2}ad^2ex^6 - \frac{1}{16}bd^3nx^4 + \frac{1}{4}bd^3x^4\log(cx^n) + \frac{1}{4}ad^3x^4$$

input
```
integrate(x^3*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/100*b*e^3*n*x^10 + 1/10*b*e^3*x^10*log(c*x^n) + 1/10*a*e^3*x^10 - 3/64*
b*d*e^2*n*x^8 + 3/8*b*d*e^2*x^8*log(c*x^n) + 3/8*a*d*e^2*x^8 - 1/12*b*d^2*
e*n*x^6 + 1/2*b*d^2*e*x^6*log(c*x^n) + 1/2*a*d^2*e*x^6 - 1/16*b*d^3*n*x^4
+ 1/4*b*d^3*x^4*log(c*x^n) + 1/4*a*d^3*x^4
```

3.197.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.36

$$\begin{aligned}\int x^3(d+ex^2)^3(a+b\log(cx^n))\,dx =& \frac{1}{10}be^3nx^{10}\log(x) - \frac{1}{100}be^3nx^{10} \\ &+ \frac{1}{10}be^3x^{10}\log(c) + \frac{1}{10}ae^3x^{10} + \frac{3}{8}bde^2nx^8\log(x) \\ &- \frac{3}{64}bde^2nx^8 + \frac{3}{8}bde^2x^8\log(c) + \frac{3}{8}ade^2x^8 \\ &+ \frac{1}{2}bd^2enx^6\log(x) - \frac{1}{12}bd^2enx^6 \\ &+ \frac{1}{2}bd^2ex^6\log(c) + \frac{1}{2}ad^2ex^6 + \frac{1}{4}bd^3nx^4\log(x) \\ &- \frac{1}{16}bd^3nx^4 + \frac{1}{4}bd^3x^4\log(c) + \frac{1}{4}ad^3x^4\end{aligned}$$

input
```
integrate(x^3*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/10*b*e^3*n*x^10*log(x) - 1/100*b*e^3*n*x^10 + 1/10*b*e^3*x^10*log(c) + 1
/10*a*e^3*x^10 + 3/8*b*d*e^2*n*x^8*log(x) - 3/64*b*d*e^2*n*x^8 + 3/8*b*d*e
^2*x^8*log(c) + 3/8*a*d*e^2*x^8 + 1/2*b*d^2*e*n*x^6*log(x) - 1/12*b*d^2*e*
n*x^6 + 1/2*b*d^2*e*x^6*log(c) + 1/2*a*d^2*e*x^6 + 1/4*b*d^3*n*x^4*log(x)
- 1/16*b*d^3*n*x^4 + 1/4*b*d^3*x^4*log(c) + 1/4*a*d^3*x^4
```

3.197.9 Mupad [B] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.87

$$\int x^3 (d+ex^2)^3 (a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(\frac{b\,d^3\,x^4}{4}+\frac{b\,d^2\,e\,x^6}{2}+\frac{3\,b\,d\,e^2\,x^8}{8}+\frac{b\,e^3\,x^{10}}{10}\right) + \frac{d^3\,x^4\,(4\,a-b\,n)}{16}+\frac{e^3\,x^{10}\,(10\,a-b\,n)}{100} + \frac{d^2\,e\,x^6\,(6\,a-b\,n)}{12}+\frac{3\,d\,e^2\,x^8\,(8\,a-b\,n)}{64}$$

input
```
int(x^3*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^3*x^4)/4 + (b*e^3*x^10)/10 + (b*d^2*e*x^6)/2 + (3*b*d*e^2
*x^8)/8) + (d^3*x^4*(4*a - b*n))/16 + (e^3*x^10*(10*a - b*n))/100 + (d^2*e
*x^6*(6*a - b*n))/12 + (3*d*e^2*x^8*(8*a - b*n))/64
```

3.198 $\int x(d+ex^2)^3 (a+b\log(cx^n))\,dx$

3.198.1 Optimal result

Integrand size = 21, antiderivative size = 91

$$\int x(d+ex^2)^3 (a+b\log(cx^n))\,dx = -\frac{1}{4}bd^3nx^2 - \frac{3}{16}bd^2enx^4 - \frac{1}{12}bde^2nx^6 - \frac{1}{64}be^3nx^8 - \frac{bd^4n\log(x)}{8e} + \frac{(d+ex^2)^4(a+b\log(cx^n))}{8e}$$

output
```
-1/4*b*d^3*n*x^2-3/16*b*d^2*e*n*x^4-1/12*b*d*e^2*n*x^6-1/64*b*e^3*n*x^8-1/
8*b*d^4*n*ln(x)/e+1/8*(e*x^2+d)^4*(a+b*ln(c*x^n))/e
```

3.198.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.30

$$\int x(d+ex^2)^3 (a+b\log(cx^n))\,dx = \frac{1}{192}x^2\left(24a\left(4d^3+6d^2ex^2+4de^2x^4+e^3x^6\right) - bn\left(48d^3+36d^2ex^2+16de^2x^4+3e^3x^6\right) + 24b\left(4d^3+6d^2ex^2+4de^2x^4+e^3x^6\right)\log(cx^n)\right)$$

input
```
Integrate[x*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(24*a*(4*d^3 + 6*d^2*e*x^2 + 4*d*e^2*x^4 + e^3*x^6) - b*n*(48*d^3 + 3
6*d^2*e*x^2 + 16*d*e^2*x^4 + 3*e^3*x^6) + 24*b*(4*d^3 + 6*d^2*e*x^2 + 4*d*
e^2*x^4 + e^3*x^6)*Log[c*x^n]))/192
```

3.198.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 86, normalized size of antiderivative = 0.95, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {2771, 27, 243, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex^2)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{(d+ex^2)^4 (a+b\log(cx^n))}{8e} - bn\int \frac{(ex^2+d)^4}{8ex}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{(d+ex^2)^4 (a+b\log(cx^n))}{8e} - \frac{bn\int \frac{(ex^2+d)^4}{x}dx}{8e}$$

$$\Big\downarrow \text{243}$$

$$\frac{(d+ex^2)^4 (a+b\log(cx^n))}{8e} - \frac{bn\int \frac{(ex^2+d)^4}{x^2}dx^2}{16e}$$

$$\Big\downarrow \text{49}$$

$$\frac{(d+ex^2)^4 (a+b\log(cx^n))}{8e} - \frac{bn\int \left(e^4x^6+4de^3x^4+6d^2e^2x^2+4d^3e+\frac{d^4}{x^2}\right)dx^2}{16e}$$

$$\Big\downarrow \text{2009}$$

$$\frac{(d+ex^2)^4 (a+b\log(cx^n))}{8e} - \frac{bn\left(d^4\log(x^2)+4d^3ex^2+3d^2e^2x^4+\frac{4}{3}de^3x^6+\frac{e^4x^8}{4}\right)}{16e}$$

input
```
Int[x*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/16*(b*n*(4*d^3*e*x^2 + 3*d^2*e^2*x^4 + (4*d*e^3*x^6)/3 + (e^4*x^8)/4 +
d^4*Log[x^2]))/e + ((d + e*x^2)^4*(a + b*Log[c*x^n]))/(8*e)
```

3.198.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.198.4 Maple [A] (verified)

Time = 0.73 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.58

method	result
parallelrisch	$\frac{x^{8} \ln \left(c \,x^{n}\right) b \,e^{3}}{8}-\frac{b \,e^{3} n \,x^{8}}{64}+\frac{a \,e^{3} x^{8}}{8}+\frac{x^{6} \ln \left(c \,x^{n}\right) b d \,e^{2}}{2}-\frac{b d \,e^{2} n \,x^{6}}{12}+\frac{a d \,e^{2} x^{6}}{2}+\frac{3 x^{4} b \ln \left(c \,x^{n}\right) d^{2} e}{4}-\frac{3 b \,d^{2} e n \,x^{4}}{16}+$
risch	$\frac{\left(e \,x^{2}+d \right)^{4} b \ln \left(x^{n}\right)}{8 e}+\frac{a \,e^{3} x^{8}}{8}-\frac{i e^{3} \pi b \,x^{8} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{16}+\frac{a d \,e^{2} x^{6}}{2}-\frac{i \pi b \,d^{3} x^{2} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{4}-\frac{i \pi b d \,e^{2} x^{6} \operatorname{csgn}\left(i c \,x^{n}\right)^{3}}{4}+$

input
```
int(x*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/8*x^8*ln(c*x^n)*b*e^3-1/64*b*e^3*n*x^8+1/8*a*e^3*x^8+1/2*x^6*ln(c*x^n)*b
*d*e^2-1/12*b*d*e^2*n*x^6+1/2*a*d*e^2*x^6+3/4*x^4*b*ln(c*x^n)*d^2*e-3/16*b
*d^2*e*n*x^4+3/4*x^4*a*d^2*e+1/2*x^2*b*ln(c*x^n)*d^3-1/4*b*d^3*n*x^2+1/2*a
*d^3*x^2
```

3.198.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 165 vs. $2(79) = 158$.

Time = 0.32 (sec) , antiderivative size = 165, normalized size of antiderivative = 1.81

$$\int x(d+ex^2)^3(a+b\log(cx^n))\,dx = -\frac{1}{64}(be^3n-8\,ae^3)x^8 - \frac{1}{12}(bde^2n-6\,ade^2)x^6 - \frac{3}{16}(bd^2en-4\,ad^2e)x^4 - \frac{1}{4}(bd^3n-2\,ad^3)x^2 + \frac{1}{8}(be^3x^8+4\,bde^2x^6+6\,bd^2ex^4+4\,bd^3x^2)\log(c) + \frac{1}{8}(be^3nx^8+4\,bde^2nx^6+6\,bd^2enx^4+4\,bd^3nx^2)\log(x)$$

input
```
integrate(x*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/64*(b*e^3*n - 8*a*e^3)*x^8 - 1/12*(b*d*e^2*n - 6*a*d*e^2)*x^6 - 3/16*(b
*d^2*e*n - 4*a*d^2*e)*x^4 - 1/4*(b*d^3*n - 2*a*d^3)*x^2 + 1/8*(b*e^3*x^8 +
 4*b*d*e^2*x^6 + 6*b*d^2*e*x^4 + 4*b*d^3*x^2)*log(c) + 1/8*(b*e^3*n*x^8 +
4*b*d*e^2*n*x^6 + 6*b*d^2*e*n*x^4 + 4*b*d^3*n*x^2)*log(x)
```

3.198.6 Sympy [A] (verification not implemented)

Time = 0.91 (sec) , antiderivative size = 170, normalized size of antiderivative = 1.87

$$\int x(d+ex^2)^3(a+b\log(cx^n))\,dx = \frac{ad^3x^2}{2} + \frac{3ad^2ex^4}{4} + \frac{ade^2x^6}{2} + \frac{ae^3x^8}{8} - \frac{bd^3nx^2}{4} + \frac{bd^3x^2\log(cx^n)}{2} - \frac{3bd^2enx^4}{16} + \frac{3bd^2ex^4\log(cx^n)}{4} - \frac{bde^2nx^6}{12} + \frac{bde^2x^6\log(cx^n)}{2} - \frac{be^3nx^8}{64} + \frac{be^3x^8\log(cx^n)}{8}$$

input
```
integrate(x*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**2/2 + 3*a*d**2*e*x**4/4 + a*d*e**2*x**6/2 + a*e**3*x**8/8 - b*d*
*3*n*x**2/4 + b*d**3*x**2*log(c*x**n)/2 - 3*b*d**2*e*n*x**4/16 + 3*b*d**2*
e*x**4*log(c*x**n)/4 - b*d*e**2*n*x**6/12 + b*d*e**2*x**6*log(c*x**n)/2 -
b*e**3*n*x**8/64 + b*e**3*x**8*log(c*x**n)/8
```

3.198.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.57

$$\int x(d+ex^2)^3 (a+b\log(cx^n))\,dx = -\frac{1}{64}be^3nx^8 + \frac{1}{8}be^3x^8\log(cx^n) + \frac{1}{8}ae^3x^8 - \frac{1}{12}bde^2nx^6 + \frac{1}{2}bde^2x^6\log(cx^n) + \frac{1}{2}ade^2x^6 - \frac{3}{16}bd^2enx^4 + \frac{3}{4}bd^2ex^4\log(cx^n) + \frac{3}{4}ad^2ex^4 - \frac{1}{4}bd^3nx^2 + \frac{1}{2}bd^3x^2\log(cx^n) + \frac{1}{2}ad^3x^2$$

input
```
integrate(x*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/64*b*e^3*n*x^8 + 1/8*b*e^3*x^8*log(c*x^n) + 1/8*a*e^3*x^8 - 1/12*b*d*e^
2*n*x^6 + 1/2*b*d*e^2*x^6*log(c*x^n) + 1/2*a*d*e^2*x^6 - 3/16*b*d^2*e*n*x^
4 + 3/4*b*d^2*e*x^4*log(c*x^n) + 3/4*a*d^2*e*x^4 - 1/4*b*d^3*n*x^2 + 1/2*b
*d^3*x^2*log(c*x^n) + 1/2*a*d^3*x^2
```

3.198.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 177 vs. $2(79) = 158$.

Time = 0.38 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.95

$$\int x(d+ex^2)^3 (a+b\log(cx^n))\,dx = \frac{1}{8}be^3nx^8\log(x) - \frac{1}{64}be^3nx^8 + \frac{1}{8}be^3x^8\log(c) + \frac{1}{8}ae^3x^8 + \frac{1}{2}bde^2nx^6\log(x) - \frac{1}{12}bde^2nx^6 + \frac{1}{2}bde^2x^6\log(c) + \frac{1}{2}ade^2x^6 + \frac{3}{4}bd^2enx^4\log(x) - \frac{3}{16}bd^2enx^4 + \frac{3}{4}bd^2ex^4\log(c) + \frac{3}{4}ad^2ex^4 + \frac{1}{2}bd^3nx^2\log(x) - \frac{1}{4}bd^3nx^2 + \frac{1}{2}bd^3x^2\log(c) + \frac{1}{2}ad^3x^2$$

input
```
integrate(x*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/8*b*e^3*n*x^8*log(x) - 1/64*b*e^3*n*x^8 + 1/8*b*e^3*x^8*log(c) + 1/8*a*e
^3*x^8 + 1/2*b*d*e^2*n*x^6*log(x) - 1/12*b*d*e^2*n*x^6 + 1/2*b*d*e^2*x^6*l
og(c) + 1/2*a*d*e^2*x^6 + 3/4*b*d^2*e*n*x^4*log(x) - 3/16*b*d^2*e*n*x^4 +
3/4*b*d^2*e*x^4*log(c) + 3/4*a*d^2*e*x^4 + 1/2*b*d^3*n*x^2*log(x) - 1/4*b*
d^3*n*x^2 + 1/2*b*d^3*x^2*log(c) + 1/2*a*d^3*x^2
```

3.198.9 Mupad [B] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.24

$$\int x(d+ex^2)^3\,(a+b\log{(cx^n)})\,dx = \ln{(c\,x^n)}\,\left(\frac{b\,d^3\,x^2}{2}+\frac{3\,b\,d^2\,e\,x^4}{4}+\frac{b\,d\,e^2\,x^6}{2}+\frac{b\,e^3\,x^8}{8}\right) + \frac{d^3\,x^2\,(2\,a-b\,n)}{4}+\frac{e^3\,x^8\,(8\,a-b\,n)}{64} + \frac{3\,d^2\,e\,x^4\,(4\,a-b\,n)}{16}+\frac{d\,e^2\,x^6\,(6\,a-b\,n)}{12}$$

input
```
int(x*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^3*x^2)/2 + (b*e^3*x^8)/8 + (3*b*d^2*e*x^4)/4 + (b*d*e^2*x
^6)/2) + (d^3*x^2*(2*a - b*n))/4 + (e^3*x^8*(8*a - b*n))/64 + (3*d^2*e*x^4
*(4*a - b*n))/16 + (d*e^2*x^6*(6*a - b*n))/12
```

3.199 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x}\,dx$

3.199.1 Optimal result

Integrand size = 23, antiderivative size = 130

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x}\,dx = -\frac{3}{4}bd^2enx^2 - \frac{3}{16}bde^2nx^4 - \frac{1}{36}be^3nx^6 - \frac{1}{2}bd^3n\log^2(x) + \frac{3}{2}d^2ex^2(a+b\log(cx^n)) + \frac{3}{4}de^2x^4(a+b\log(cx^n)) + \frac{1}{6}e^3x^6(a+b\log(cx^n)) + d^3\log(x)(a+b\log(cx^n))$$

output
```
-3/4*b*d^2*e*n*x^2-3/16*b*d*e^2*n*x^4-1/36*b*e^3*n*x^6-1/2*b*d^3*n*ln(x)^2
+3/2*d^2*e*x^2*(a+b*ln(c*x^n))+3/4*d*e^2*x^4*(a+b*ln(c*x^n))+1/6*e^3*x^6*(
a+b*ln(c*x^n))+d^3*ln(x)*(a+b*ln(c*x^n))
```

3.199.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 116, normalized size of antiderivative = 0.89

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x}\,dx = \frac{1}{144}\left(-108bd^2enx^2 - 27bde^2nx^4 - 4be^3nx^6 + 216d^2ex^2(a+b\log(cx^n)) + 108de^2x^4(a+b\log(cx^n)) + 24e^3x^6(a+b\log(cx^n)) + \frac{72d^3(a+b\log(cx^n))^2}{bn}\right)$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
(-108*b*d^2*e*n*x^2 - 27*b*d*e^2*n*x^4 - 4*b*e^3*n*x^6 + 216*d^2*e*x^2*(a
+ b*Log[c*x^n]) + 108*d*e^2*x^4*(a + b*Log[c*x^n]) + 24*e^3*x^6*(a + b*Log
[c*x^n]) + (72*d^3*(a + b*Log[c*x^n])^2)/(b*n))/144
```

3.199.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 127, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(\frac{\log(x)d^3}{x}+\frac{1}{12}ex(2e^2x^4+9dex^2+18d^2)\right)dx+d^3\log(x)(a+b\log(cx^n))+\frac{3}{2}d^2ex^2(a+b\log(cx^n))+\frac{3}{4}de^2x^4(a+b\log(cx^n))+\frac{1}{6}e^3x^6(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$d^3\log(x)(a+b\log(cx^n))+\frac{3}{2}d^2ex^2(a+b\log(cx^n))+\frac{3}{4}de^2x^4(a+b\log(cx^n))+\frac{1}{6}e^3x^6(a+b\log(cx^n))-bn\left(\frac{1}{2}d^3\log^2(x)+\frac{3}{4}d^2ex^2+\frac{3}{16}de^2x^4+\frac{e^3x^6}{36}\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
-(b*n*((3*d^2*e*x^2)/4 + (3*d*e^2*x^4)/16 + (e^3*x^6)/36 + (d^3*Log[x]^2)/
2)) + (3*d^2*e*x^2*(a + b*Log[c*x^n]))/2 + (3*d*e^2*x^4*(a + b*Log[c*x^n])
)/4 + (e^3*x^6*(a + b*Log[c*x^n]))/6 + d^3*Log[x]*(a + b*Log[c*x^n])
```

3.199.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.199.4 Maple [A] (verified)

Time = 0.72 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.15

method	result
parallelrisch	$\frac{24x^6 \ln(c\,x^n) b\,e^3 n-4x^6 b\,e^3 n^2+24x^6 a\,e^3 n+108x^4 \ln(c\,x^n) bd\,e^2 n-27x^4 bd\,e^2 n^2+108x^4 ad\,e^2 n+216x^2 \ln(c\,x^n) b\,d^2 en-108x^2 b\,d}{144n}$
risch	$\frac{x^6 a\,e^3}{6}+\frac{3\ln(c) bd\,e^2 x^4}{4}-\frac{3i\pi bd\,e^2 x^4 \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)}{8}-\frac{3ie\pi b\,d^2 x^2 \operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)}{4}-\frac{i\ln(}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/144*(24*x^6*ln(c*x^n)*b*e^3*n-4*x^6*b*e^3*n^2+24*x^6*a*e^3*n+108*x^4*ln(
c*x^n)*b*d*e^2*n-27*x^4*b*d*e^2*n^2+108*x^4*a*d*e^2*n+216*x^2*ln(c*x^n)*b*
d^2*e*n-108*x^2*b*d^2*e*n^2+216*x^2*a*d^2*e*n+144*ln(x)*a*d^3*n+72*b*d^3*l
n(c*x^n)^2)/n
```

3.199.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.19

$$\begin{aligned}
&\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x}\,dx \\
&= -\frac{1}{36}\left(be^3n-6\,ae^3\right)x^6+\frac{1}{2}\,bd^3n\log(x)^2-\frac{3}{16}\left(bde^2n-4\,ade^2\right)x^4 \\
&\quad -\frac{3}{4}\left(bd^2en-2\,ad^2e\right)x^2+\frac{1}{12}\left(2\,be^3x^6+9\,bde^2x^4+18\,bd^2ex^2\right)\log(c) \\
&\quad +\frac{1}{12}\left(2\,be^3nx^6+9\,bde^2nx^4+18\,bd^2enx^2+12\,bd^3\log(c)+12\,ad^3\right)\log(x)
\end{aligned}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
-1/36*(b*e^3*n - 6*a*e^3)*x^6 + 1/2*b*d^3*n*log(x)^2 - 3/16*(b*d*e^2*n - 4
*a*d*e^2)*x^4 - 3/4*(b*d^2*e*n - 2*a*d^2*e)*x^2 + 1/12*(2*b*e^3*x^6 + 9*b*
d*e^2*x^4 + 18*b*d^2*e*x^2)*log(c) + 1/12*(2*b*e^3*n*x^6 + 9*b*d*e^2*n*x^4
 + 18*b*d^2*e*n*x^2 + 12*b*d^3*log(c) + 12*a*d^3)*log(x)
```

3.199.6 Sympy [A] (verification not implemented)

Time = 0.94 (sec) , antiderivative size = 212, normalized size of antiderivative = 1.63

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x}\,dx = \begin{cases} \frac{ad^3\log(cx^n)}{n} + \frac{3ad^2ex^2}{2} + \frac{3ade^2x^4}{4} + \frac{ae^3x^6}{6} + \frac{bd^3\log(cx^n)^2}{2n} - \frac{3bd^2enx^2}{4} + \frac{3bd^2ex^2\log(cx^n)}{2} - \frac{3bde^2nx^4}{16} + \frac{3bde^2x^4\log(cx^n)}{4} \\ (a+b\log(c))\left(d^3\log(x) + \frac{3d^2ex^2}{2} + \frac{3de^2x^4}{4} + \frac{e^3x^6}{6}\right) \end{cases}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise((a*d**3*log(c*x**n)/n + 3*a*d**2*e*x**2/2 + 3*a*d*e**2*x**4/4 +
a*e**3*x**6/6 + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*e*n*x**2/4 + 3*b*d*
*2*e*x**2*log(c*x**n)/2 - 3*b*d*e**2*n*x**4/16 + 3*b*d*e**2*x**4*log(c*x**
n)/4 - b*e**3*n*x**6/36 + b*e**3*x**6*log(c*x**n)/6, Ne(n, 0)), ((a + b*lo
g(c))*(d**3*log(x) + 3*d**2*e*x**2/2 + 3*d*e**2*x**4/4 + e**3*x**6/6), Tru
e))
```

3.199.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x}\,dx = -\frac{1}{36}be^3nx^6 + \frac{1}{6}be^3x^6\log(cx^n) + \frac{1}{6}ae^3x^6 - \frac{3}{16}bde^2nx^4 + \frac{3}{4}bde^2x^4\log(cx^n) + \frac{3}{4}ade^2x^4 - \frac{3}{4}bd^2enx^2 + \frac{3}{2}bd^2ex^2\log(cx^n) + \frac{3}{2}ad^2ex^2 + \frac{bd^3\log(cx^n)^2}{2n} + ad^3\log(x)$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
-1/36*b*e^3*n*x^6 + 1/6*b*e^3*x^6*log(c*x^n) + 1/6*a*e^3*x^6 - 3/16*b*d*e^
2*n*x^4 + 3/4*b*d*e^2*x^4*log(c*x^n) + 3/4*a*d*e^2*x^4 - 3/4*b*d^2*e*n*x^2
 + 3/2*b*d^2*e*x^2*log(c*x^n) + 3/2*a*d^2*e*x^2 + 1/2*b*d^3*log(c*x^n)^2/n
 + a*d^3*log(x)
```

3.199.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.15

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x}\,dx = -\frac{1}{36}\left(be^3n - 6\,be^3\log(c) - 6\,ae^3\right)x^6 + \frac{1}{2}\,bd^3n\log(x)^2 - \frac{3}{16}\left(bde^2n - 4\,bde^2\log(c) - 4\,ade^2\right)x^4 - \frac{3}{4}\left(bd^2en - 2\,bd^2e\log(c) - 2\,ad^2e\right)x^2 + \frac{1}{12}\left(2\,be^3nx^6 + 9\,bde^2nx^4 + 18\,bd^2enx^2\right)\log(x) + \left(bd^3\log(c) + ad^3\right)\log(x)$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
-1/36*(b*e^3*n - 6*b*e^3*log(c) - 6*a*e^3)*x^6 + 1/2*b*d^3*n*log(x)^2 - 3/
16*(b*d*e^2*n - 4*b*d*e^2*log(c) - 4*a*d*e^2)*x^4 - 3/4*(b*d^2*e*n - 2*b*d
^2*e*log(c) - 2*a*d^2*e)*x^2 + 1/12*(2*b*e^3*n*x^6 + 9*b*d*e^2*n*x^4 + 18*
b*d^2*e*n*x^2)*log(x) + (b*d^3*log(c) + a*d^3)*log(x)
```

3.199.9 Mupad [B] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 112, normalized size of antiderivative = 0.86

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x}\,dx = \ln(c\,x^n)\left(\frac{3\,b\,d^2\,e\,x^2}{2} + \frac{3\,b\,d\,e^2\,x^4}{4} + \frac{b\,e^3\,x^6}{6}\right) + \frac{e^3\,x^6\,(6\,a - b\,n)}{36} + a\,d^3\,\ln(x) + \frac{b\,d^3\,\ln(c\,x^n)^2}{2\,n} + \frac{3\,d^2\,e\,x^2\,(2\,a - b\,n)}{4} + \frac{3\,d\,e^2\,x^4\,(4\,a - b\,n)}{16}$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x,x)
```

output
```
log(c*x^n)*((b*e^3*x^6)/6 + (3*b*d^2*e*x^2)/2 + (3*b*d*e^2*x^4)/4) + (e^3*
x^6*(6*a - b*n))/36 + a*d^3*log(x) + (b*d^3*log(c*x^n)^2)/(2*n) + (3*d^2*e
*x^2*(2*a - b*n))/4 + (3*d*e^2*x^4*(4*a - b*n))/16
```

3.199. $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x}\,dx$

3.200 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^3}\,dx$

3.200.1 Optimal result

Integrand size = 23, antiderivative size = 131

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^3}\,dx = -\frac{bd^3n}{4x^2}-\frac{3}{4}bde^2nx^2-\frac{1}{16}be^3nx^4-\frac{3}{2}bd^2en\log^2(x) - \frac{d^3(a+b\log(cx^n))}{2x^2}+\frac{3}{2}de^2x^2(a+b\log(cx^n)) + \frac{1}{4}e^3x^4(a+b\log(cx^n))+3d^2e\log(x)(a+b\log(cx^n))$$

output
```
-1/4*b*d^3*n/x^2-3/4*b*d*e^2*n*x^2-1/16*b*e^3*n*x^4-3/2*b*d^2*e*n*ln(x)^2-
1/2*d^3*(a+b*ln(c*x^n))/x^2+3/2*d*e^2*x^2*(a+b*ln(c*x^n))+1/4*e^3*x^4*(a+b
*ln(c*x^n))+3*d^2*e*ln(x)*(a+b*ln(c*x^n))
```

3.200.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 115, normalized size of antiderivative = 0.88

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^3}\,dx = \frac{1}{16}\left(-\frac{4bd^3n}{x^2}-12bde^2nx^2-be^3nx^4 - \frac{8d^3(a+b\log(cx^n))}{x^2}+24de^2x^2(a+b\log(cx^n)) + 4e^3x^4(a+b\log(cx^n))+\frac{24d^2e(a+b\log(cx^n))^2}{bn}\right)$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
((-4*b*d^3*n)/x^2 - 12*b*d*e^2*n*x^2 - b*e^3*n*x^4 - (8*d^3*(a + b*Log[c*x
^n]))/x^2 + 24*d*e^2*x^2*(a + b*Log[c*x^n]) + 4*e^3*x^4*(a + b*Log[c*x^n])
 + (24*d^2*e*(a + b*Log[c*x^n])^2)/(b*n))/16
```

3.200.3 Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 124, normalized size of antiderivative = 0.95, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3} dx$$

$$\Big\downarrow \ 2772$$

$$-bn\int -\frac{-e^3x^6-6de^2x^4-12d^2e\log(x)x^2+2d^3}{4x^3}dx-\frac{d^3(a+b\log(cx^n))}{2x^2}+ 3d^2e\log(x)(a+b\log(cx^n))+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{4}e^3x^4(a+b\log(cx^n))$$

$$\Big\downarrow \ 27$$

$$\frac{1}{4}bn\int \frac{-e^3x^6-6de^2x^4-12d^2e\log(x)x^2+2d^3}{x^3}dx-\frac{d^3(a+b\log(cx^n))}{2x^2}+ 3d^2e\log(x)(a+b\log(cx^n))+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{4}e^3x^4(a+b\log(cx^n))$$

$$\Big\downarrow \ 2010$$

$$\frac{1}{4}bn\int \left(\frac{-e^3x^6-6de^2x^4+2d^3}{x^3}-\frac{12d^2e\log(x)}{x}\right)dx-\frac{d^3(a+b\log(cx^n))}{2x^2}+ 3d^2e\log(x)(a+b\log(cx^n))+\frac{3}{2}de^2x^2(a+b\log(cx^n))+\frac{1}{4}e^3x^4(a+b\log(cx^n))$$

$$\Big\downarrow \ 2009$$

$$-\frac{d^3(a+b\log(cx^n))}{2x^2}+3d^2e\log(x)(a+b\log(cx^n))+\frac{3}{2}de^2x^2(a+b\log(cx^n))+ \frac{1}{4}e^3x^4(a+b\log(cx^n))+\frac{1}{4}bn\left(-\frac{d^3}{x^2}-6d^2e\log^2(x)-3de^2x^2-\frac{1}{4}e^3x^4\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-(d^3/x^2) - 3*d*e^2*x^2 - (e^3*x^4)/4 - 6*d^2*e*Log[x]^2))/4 - (d^3
*(a + b*Log[c*x^n]))/(2*x^2) + (3*d*e^2*x^2*(a + b*Log[c*x^n]))/2 + (e^3*x
^4*(a + b*Log[c*x^n]))/4 + 3*d^2*e*Log[x]*(a + b*Log[c*x^n])
```

3.200.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.200.4 Maple [A] (verified)

Time = 0.75 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.14

method	result
parallelrisch	$\frac{4x^6\ln(c\,x^n)b\,e^3n-x^6b\,e^3n^2+4x^6a\,e^3n+24x^4\ln(c\,x^n)bd\,e^2n-12x^4bd\,e^2n^2+24x^4ad\,e^2n+48\ln(x)x^2a\,d^2en+24e\,d^2b\ln(c\,x^n)^2x}{16x^2n}$
risch	Expression too large to display

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
1/16/x^2*(4*x^6*ln(c*x^n)*b*e^3*n-x^6*b*e^3*n^2+4*x^6*a*e^3*n+24*x^4*ln(c*
x^n)*b*d*e^2*n-12*x^4*b*d*e^2*n^2+24*x^4*a*d*e^2*n+48*ln(x)*x^2*a*d^2*e*n+
24*e*d^2*b*ln(c*x^n)^2*x^2-8*ln(c*x^n)*b*d^3*n-4*b*d^3*n^2-8*a*d^3*n)/n
```

3.200.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3}\,dx = \frac{24\,bd^2enx^2\log(x)^2 - (be^3n - 4\,ae^3)x^6 - 4\,bd^3n - 12\,(bde^2n - 2\,ade^2)x^4 - 8\,ad^3 + 4\,(be^3x^6 + 6\,bde^2x^4 - 2 \cdots}{16\,x^2}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
1/16*(24*b*d^2*e*n*x^2*log(x)^2 - (b*e^3*n - 4*a*e^3)*x^6 - 4*b*d^3*n - 12
*(b*d*e^2*n - 2*a*d*e^2)*x^4 - 8*a*d^3 + 4*(b*e^3*x^6 + 6*b*d*e^2*x^4 - 2*
b*d^3)*log(c) + 4*(b*e^3*n*x^6 + 6*b*d*e^2*n*x^4 + 12*b*d^2*e*x^2*log(c) +
 12*a*d^2*e*x^2 - 2*b*d^3*n)*log(x))/x^2
```

3.200.6 Sympy [A] (verification not implemented)

Time = 1.01 (sec) , antiderivative size = 209, normalized size of antiderivative = 1.60

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3}\,dx = \begin{cases} -\frac{ad^3}{2x^2} + \frac{3ad^2e\log(cx^n)}{n} + \frac{3ade^2x^2}{2} + \frac{ae^3x^4}{4} - \frac{bd^3n}{4x^2} - \frac{bd^3\log(cx^n)}{2x^2} + \frac{3bd^2e\log(cx^n)^2}{2n} - \frac{3bde^2nx^2}{4} + \frac{3bde^2x^2\log(cx^n)}{2} - \frac{be^3 \cdots}{\cdots} \\ (a+b\log(c))\left(-\frac{d^3}{2x^2} + 3d^2e\log(x) + \frac{3de^2x^2}{2} + \frac{e^3x^4}{4}\right) \end{cases}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Piecewise((-a*d**3/(2*x**2) + 3*a*d**2*e*log(c*x**n)/n + 3*a*d*e**2*x**2/2
 + a*e**3*x**4/4 - b*d**3*n/(4*x**2) - b*d**3*log(c*x**n)/(2*x**2) + 3*b*d
**2*e*log(c*x**n)**2/(2*n) - 3*b*d*e**2*n*x**2/4 + 3*b*d*e**2*x**2*log(c*x
**n)/2 - b*e**3*n*x**4/16 + b*e**3*x**4*log(c*x**n)/4, Ne(n, 0)), ((a + b*
log(c))*(-d**3/(2*x**2) + 3*d**2*e*log(x) + 3*d*e**2*x**2/2 + e**3*x**4/4)
, True))
```

3.200.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3} dx = -\frac{1}{16} be^3nx^4 + \frac{1}{4} be^3x^4 \log(cx^n) + \frac{1}{4} ae^3x^4 - \frac{3}{4} bde^2nx^2 + \frac{3}{2} bde^2x^2 \log(cx^n) + \frac{3}{2} ade^2x^2 + \frac{3 bd^2e \log(cx^n)^2}{2 n} + 3 ad^2e \log(x) - \frac{bd^3n}{4 x^2} - \frac{bd^3 \log(cx^n)}{2 x^2} - \frac{ad^3}{2 x^2}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
-1/16*b*e^3*n*x^4 + 1/4*b*e^3*x^4*log(c*x^n) + 1/4*a*e^3*x^4 - 3/4*b*d*e^2
*n*x^2 + 3/2*b*d*e^2*x^2*log(c*x^n) + 3/2*a*d*e^2*x^2 + 3/2*b*d^2*e*log(c*
x^n)^2/n + 3*a*d^2*e*log(x) - 1/4*b*d^3*n/x^2 - 1/2*b*d^3*log(c*x^n)/x^2 -
 1/2*a*d^3/x^2
```

3.200.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 156, normalized size of antiderivative = 1.19

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^3} dx = \frac{1}{4} be^3x^4 \log(c) + \frac{1}{4} ae^3x^4 + \frac{3}{2} bde^2x^2 \log(c) + \frac{3}{2} bd^2en \log(x)^2 + \frac{3}{4} (2 x^2 \log(x) - x^2) bde^2n + \frac{1}{16} (4 x^4 \log(x) - x^4) be^3n + \frac{3}{2} ade^2x^2 - \frac{1}{4} bd^3n \left(\frac{2 \log(x)}{x^2} + \frac{1}{x^2}\right) + 3 bd^2e \log(c) \log(|x|) + 3 ad^2e \log(|x|) - \frac{bd^3 \log(c)}{2 x^2} - \frac{ad^3}{2 x^2}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
1/4*b*e^3*x^4*log(c) + 1/4*a*e^3*x^4 + 3/2*b*d*e^2*x^2*log(c) + 3/2*b*d^2*
e*n*log(x)^2 + 3/4*(2*x^2*log(x) - x^2)*b*d*e^2*n + 1/16*(4*x^4*log(x) - x
^4)*b*e^3*n + 3/2*a*d*e^2*x^2 - 1/4*b*d^3*n*(2*log(x)/x^2 + 1/x^2) + 3*b*d
^2*e*log(c)*log(abs(x)) + 3*a*d^2*e*log(abs(x)) - 1/2*b*d^3*log(c)/x^2 - 1
/2*a*d^3/x^2
```

3.200.9 Mupad [B] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.24

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^3}\,dx = \ln(c\,x^n)\left(\frac{\frac{3\,b\,e^3\,x^6}{4}+3\,b\,d\,e^2\,x^4}{x^2} - \frac{\frac{b\,d^3}{2}+\frac{3\,b\,d^2\,e\,x^2}{2}+\frac{3\,b\,d\,e^2\,x^4}{2}+\frac{b\,e^3\,x^6}{2}}{x^2}\right) - \frac{\frac{a\,d^3}{2}+\frac{b\,d^3\,n}{4}}{x^2} + \ln(x)\left(3\,a\,d^2\,e+\frac{3\,b\,d^2\,e\,n}{2}\right) + \frac{e^3\,x^4\,(4\,a-b\,n)}{16} + \frac{3\,d\,e^2\,x^2\,(2\,a-b\,n)}{4} + \frac{3\,b\,d^2\,e\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^3,x)
```

output
```
log(c*x^n)*(((3*b*e^3*x^6)/4 + 3*b*d*e^2*x^4)/x^2 - ((b*d^3)/2 + (b*e^3*x^
6)/2 + (3*b*d^2*e*x^2)/2 + (3*b*d*e^2*x^4)/2)/x^2) - ((a*d^3)/2 + (b*d^3*n
)/4)/x^2 + log(x)*(3*a*d^2*e + (3*b*d^2*e*n)/2) + (e^3*x^4*(4*a - b*n))/16
 + (3*d*e^2*x^2*(2*a - b*n))/4 + (3*b*d^2*e*log(c*x^n)^2)/(2*n)
```

3.201 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^5}\,dx$

3.201.1 Optimal result

Integrand size = 23, antiderivative size = 131

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^5}\,dx = -\frac{bd^3n}{16x^4}-\frac{3bd^2en}{4x^2}-\frac{1}{4}be^3nx^2-\frac{3}{2}bde^2n\log^2(x)-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}+\frac{1}{2}e^3x^2(a+b\log(cx^n))+3de^2\log(x)\,(a+b\log(cx^n))$$

output
```
-1/16*b*d^3*n/x^4-3/4*b*d^2*e*n/x^2-1/4*b*e^3*n*x^2-3/2*b*d*e^2*n*ln(x)^2-
1/4*d^3*(a+b*ln(c*x^n))/x^4-3/2*d^2*e*(a+b*ln(c*x^n))/x^2+1/2*e^3*x^2*(a+b
*ln(c*x^n))+3*d*e^2*ln(x)*(a+b*ln(c*x^n))
```

3.201.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 115, normalized size of antiderivative = 0.88

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^5}\,dx = \frac{1}{16}\left(-\frac{bd^3n}{x^4}-\frac{12bd^2en}{x^2}-4be^3nx^2-\frac{4d^3(a+b\log(cx^n))}{x^4}-\frac{24d^2e(a+b\log(cx^n))}{x^2}+8e^3x^2(a+b\log(cx^n))+\frac{24de^2(a+b\log(cx^n))^2}{bn}\right)$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(-((b*d^3*n)/x^4) - (12*b*d^2*e*n)/x^2 - 4*b*e^3*n*x^2 - (4*d^3*(a + b*Log
[c*x^n]))/x^4 - (24*d^2*e*(a + b*Log[c*x^n]))/x^2 + 8*e^3*x^2*(a + b*Log[c
*x^n]) + (24*d*e^2*(a + b*Log[c*x^n])^2)/(b*n))/16
```

3.201.3 Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 124, normalized size of antiderivative = 0.95, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^5}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{-2e^3x^6-12de^2\log(x)x^4+6d^2ex^2+d^3}{4x^5}dx-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}+3de^2\log(x)(a+b\log(cx^n))+\frac{1}{2}e^3x^2(a+b\log(cx^n))$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}bn\int \frac{-2e^3x^6-12de^2\log(x)x^4+6d^2ex^2+d^3}{x^5}dx-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}+3de^2\log(x)(a+b\log(cx^n))+\frac{1}{2}e^3x^2(a+b\log(cx^n))$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{4}bn\int \left(\frac{-2e^3x^6+6d^2ex^2+d^3}{x^5}-\frac{12de^2\log(x)}{x}\right)dx-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}+3de^2\log(x)(a+b\log(cx^n))+\frac{1}{2}e^3x^2(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2e(a+b\log(cx^n))}{2x^2}+3de^2\log(x)(a+b\log(cx^n))+\frac{1}{2}e^3x^2(a+b\log(cx^n))+\frac{1}{4}bn\left(-\frac{d^3}{4x^4}-\frac{3d^2e}{x^2}-6de^2\log^2(x)-e^3x^2\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-1/4*d^3/x^4 - (3*d^2*e)/x^2 - e^3*x^2 - 6*d*e^2*Log[x]^2))/4 - (d^3
*(a + b*Log[c*x^n]))/(4*x^4) - (3*d^2*e*(a + b*Log[c*x^n]))/(2*x^2) + (e^3
*x^2*(a + b*Log[c*x^n]))/2 + 3*d*e^2*Log[x]*(a + b*Log[c*x^n])
```

3.201.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.201.4 Maple [A] (verified)

Time = 0.90 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.14

method	result
parallelrisch	$\frac{8x^6 \ln(c x^n) b e^3 n - 4x^6 b e^3 n^2 + 8x^6 a e^3 n + 48 \ln(x) x^4 a d e^2 n + 24 e^2 d b \ln(c x^n)^2 x^4 - 24 x^2 \ln(c x^n) b d^2 e n - 12 x^2 b d^2 e n^2 - 24 x^2 a d^2}{16 x^4 n}$
risch	$-\frac{b\left(-2e^3 x^6 - 12 e^2 d \ln(x) x^4 + 6 d^2 e x^2 + d^3\right) \ln(x^n)}{4x^4} - \frac{-48 \ln(x) a d e^2 x^4 - 48 \ln(x) \ln(c) b d e^2 x^4 + 24 e^2 d b n \ln(x)^2 x^4 - 8x^6 a e^3 - 1}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
1/16/x^4*(8*x^6*ln(c*x^n)*b*e^3*n-4*x^6*b*e^3*n^2+8*x^6*a*e^3*n+48*ln(x)*x
^4*a*d*e^2*n+24*e^2*d*b*ln(c*x^n)^2*x^4-24*x^2*ln(c*x^n)*b*d^2*e*n-12*x^2*
b*d^2*e*n^2-24*x^2*a*d^2*e*n-4*ln(c*x^n)*b*d^3*n-b*d^3*n^2-4*a*d^3*n)/n
```

3.201.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 157, normalized size of antiderivative = 1.20

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^5}\,dx$$
$$= \frac{24\,bde^2nx^4\log(x)^2 - 4\,(be^3n - 2\,ae^3)x^6 - bd^3n - 4\,ad^3 - 12\,(bd^2en + 2\,ad^2e)x^2 + 4\,(2\,be^3x^6 - 6\,bd^2ex^2 -}{16\,x^4}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
1/16*(24*b*d*e^2*n*x^4*log(x)^2 - 4*(b*e^3*n - 2*a*e^3)*x^6 - b*d^3*n - 4*
a*d^3 - 12*(b*d^2*e*n + 2*a*d^2*e)*x^2 + 4*(2*b*e^3*x^6 - 6*b*d^2*e*x^2 -
b*d^3)*log(c) + 4*(2*b*e^3*n*x^6 + 12*b*d*e^2*x^4*log(c) + 12*a*d*e^2*x^4
- 6*b*d^2*e*n*x^2 - b*d^3*n)*log(x))/x^4
```

3.201.6 Sympy [A] (verification not implemented)

Time = 1.04 (sec) , antiderivative size = 209, normalized size of antiderivative = 1.60

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^5}\,dx$$
$$= \begin{cases} -\frac{ad^3}{4x^4} - \frac{3ad^2e}{2x^2} + \frac{3ade^2\log(cx^n)}{n} + \frac{ae^3x^2}{2} - \frac{bd^3n}{16x^4} - \frac{bd^3\log(cx^n)}{4x^4} - \frac{3bd^2en}{4x^2} - \frac{3bd^2e\log(cx^n)}{2x^2} + \frac{3bde^2\log(cx^n)^2}{2n} - \frac{be^3nx^2}{4} + \\ (a+b\log(c))\left(-\frac{d^3}{4x^4} - \frac{3d^2e}{2x^2} + 3de^2\log(x) + \frac{e^3x^2}{2}\right) \end{cases}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**5,x)
```

output
```
Piecewise((-a*d**3/(4*x**4) - 3*a*d**2*e/(2*x**2) + 3*a*d*e**2*log(c*x**n)
/n + a*e**3*x**2/2 - b*d**3*n/(16*x**4) - b*d**3*log(c*x**n)/(4*x**4) - 3*
b*d**2*e*n/(4*x**2) - 3*b*d**2*e*log(c*x**n)/(2*x**2) + 3*b*d*e**2*log(c*x
**n)**2/(2*n) - b*e**3*n*x**2/4 + b*e**3*x**2*log(c*x**n)/2, Ne(n, 0)), ((
a + b*log(c))*(-d**3/(4*x**4) - 3*d**2*e/(2*x**2) + 3*d*e**2*log(x) + e**3
*x**2/2), True))
```

3.201.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^5}\,dx = -\frac{1}{4}be^3nx^2 + \frac{1}{2}be^3x^2\log(cx^n) + \frac{1}{2}ae^3x^2 + \frac{3\,bde^2\log(cx^n)^2}{2\,n} + 3\,ade^2\log(x) - \frac{3\,bd^2en}{4\,x^2} - \frac{3\,bd^2e\log(cx^n)}{2\,x^2} - \frac{3\,ad^2e}{2\,x^2} - \frac{bd^3n}{16\,x^4} - \frac{bd^3\log(cx^n)}{4\,x^4} - \frac{ad^3}{4\,x^4}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
-1/4*b*e^3*n*x^2 + 1/2*b*e^3*x^2*log(c*x^n) + 1/2*a*e^3*x^2 + 3/2*b*d*e^2*
log(c*x^n)^2/n + 3*a*d*e^2*log(x) - 3/4*b*d^2*e*n/x^2 - 3/2*b*d^2*e*log(c*
x^n)/x^2 - 3/2*a*d^2*e/x^2 - 1/16*b*d^3*n/x^4 - 1/4*b*d^3*log(c*x^n)/x^4 -
 1/4*a*d^3/x^4
```

3.201.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 154, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^5}\,dx = \frac{1}{2}be^3x^2\log(c) + \frac{3}{2}bde^2n\log(x)^2 + \frac{1}{4}\left(2\,x^2\log(x) - x^2\right)be^3n + \frac{1}{2}ae^3x^2 - \frac{3}{4}bd^2en\left(\frac{2\,\log(x)}{x^2} + \frac{1}{x^2}\right) - \frac{1}{16}bd^3n\left(\frac{4\,\log(x)}{x^4} + \frac{1}{x^4}\right) + 3\,bde^2\log(c)\log(|x|) + 3\,ade^2\log(|x|) - \frac{3\,bd^2e\log(c)}{2\,x^2} - \frac{3\,ad^2e}{2\,x^2} - \frac{bd^3\log(c)}{4\,x^4} - \frac{ad^3}{4\,x^4}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
1/2*b*e^3*x^2*log(c) + 3/2*b*d*e^2*n*log(x)^2 + 1/4*(2*x^2*log(x) - x^2)*b
*e^3*n + 1/2*a*e^3*x^2 - 3/4*b*d^2*e*n*(2*log(x)/x^2 + 1/x^2) - 1/16*b*d^3
*n*(4*log(x)/x^4 + 1/x^4) + 3*b*d*e^2*log(c)*log(abs(x)) + 3*a*d*e^2*log(a
bs(x)) - 3/2*b*d^2*e*log(c)/x^2 - 3/2*a*d^2*e/x^2 - 1/4*b*d^3*log(c)/x^4 -
 1/4*a*d^3/x^4
```

3.201.9 Mupad [B] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.14

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^5}\,dx = \ln(x)\left(3\,a\,d\,e^2+\frac{9\,b\,d\,e^2\,n}{4}\right) - \ln(c\,x^n)\left(\frac{\frac{b\,d^3}{4}+\frac{3\,b\,d^2\,e\,x^2}{2}+\frac{9\,b\,d\,e^2\,x^4}{4}+b\,e^3\,x^6}{x^4} - \frac{3\,b\,e^3\,x^2}{2}\right) - \frac{a\,d^3+x^2\,(6\,a\,d^2\,e+3\,b\,d^2\,e\,n)+\frac{b\,d^3\,n}{4}}{4\,x^4} + \frac{e^3\,x^2\,(2\,a-b\,n)}{4} + \frac{3\,b\,d\,e^2\,\ln(c\,x^n)^2}{2\,n}$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^5,x)
```

output
```
log(x)*(3*a*d*e^2 + (9*b*d*e^2*n)/4) - log(c*x^n)*(((b*d^3)/4 + b*e^3*x^6
+ (3*b*d^2*e*x^2)/2 + (9*b*d*e^2*x^4)/4)/x^4 - (3*b*e^3*x^2)/2) - (a*d^3 +
 x^2*(6*a*d^2*e + 3*b*d^2*e*n) + (b*d^3*n)/4)/(4*x^4) + (e^3*x^2*(2*a - b*
n))/4 + (3*b*d*e^2*log(c*x^n)^2)/(2*n)
```

3.202 $\int x^4(d+ex^2)^3(a+b\log(cx^n))\,dx$

3.202.1 Optimal result

Integrand size = 23, antiderivative size = 100

$$\int x^4(d+ex^2)^3(a+b\log(cx^n))\,dx = -\frac{1}{25}bd^3nx^5-\frac{3}{49}bd^2enx^7-\frac{1}{27}bde^2nx^9-\frac{1}{121}be^3nx^{11}+\frac{(231d^3x^5+495d^2ex^7+385de^2x^9+105e^3x^{11})(a+b\log(cx^n))}{1155}$$

output
```
-1/25*b*d^3*n*x^5-3/49*b*d^2*e*n*x^7-1/27*b*d*e^2*n*x^9-1/121*b*e^3*n*x^11
+1/1155*(105*e^3*x^11+385*d*e^2*x^9+495*d^2*e*x^7+231*d^3*x^5)*(a+b*ln(c*x
^n))
```

3.202.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.33

$$\int x^4(d+ex^2)^3(a+b\log(cx^n))\,dx = -\frac{1}{25}bd^3nx^5-\frac{3}{49}bd^2enx^7-\frac{1}{27}bde^2nx^9-\frac{1}{121}be^3nx^{11}+\frac{1}{5}d^3x^5(a+b\log(cx^n))+\frac{3}{7}d^2ex^7(a+b\log(cx^n))+\frac{1}{3}de^2x^9(a+b\log(cx^n))+\frac{1}{11}e^3x^{11}(a+b\log(cx^n))$$

input
```
Integrate[x^4*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/25*(b*d^3*n*x^5) - (3*b*d^2*e*n*x^7)/49 - (b*d*e^2*n*x^9)/27 - (b*e^3*n
*x^11)/121 + (d^3*x^5*(a + b*Log[c*x^n]))/5 + (3*d^2*e*x^7*(a + b*Log[c*x^
n]))/7 + (d*e^2*x^9*(a + b*Log[c*x^n]))/3 + (e^3*x^11*(a + b*Log[c*x^n]))/
11
```

3.202.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 97, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4 (d+ex^2)^3 (a+b\log(cx^n))\,dx$$
$$\Big\downarrow \text{2771}$$
$$\frac{(231d^3x^5+495d^2ex^7+385de^2x^9+105e^3x^{11})(a+b\log(cx^n))}{1155}-bn\int\left(\frac{e^3x^{10}}{11}+\frac{1}{3}de^2x^8+\frac{3}{7}d^2ex^6+\frac{d^3x^4}{5}\right)dx$$
$$\Big\downarrow \text{2009}$$
$$\frac{(231d^3x^5+495d^2ex^7+385de^2x^9+105e^3x^{11})(a+b\log(cx^n))}{1155}-bn\left(\frac{d^3x^5}{25}+\frac{3}{49}d^2ex^7+\frac{1}{27}de^2x^9+\frac{e^3x^{11}}{121}\right)$$

input
```
Int[x^4*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d^3*x^5)/25 + (3*d^2*e*x^7)/49 + (d*e^2*x^9)/27 + (e^3*x^11)/121))
 + ((231*d^3*x^5 + 495*d^2*e*x^7 + 385*d*e^2*x^9 + 105*e^3*x^11)*(a + b*Lo
g[c*x^n]))/1155
```

3.202.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.202.4 Maple [A] (verified)

Time = 1.37 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.44

method	result
parallelrisch	$\frac{x^{11}b\ln(c\,x^n)e^3}{11}-\frac{b\,e^3 n\,x^{11}}{121}+\frac{x^{11}a\,e^3}{11}+\frac{x^9 b\ln(c\,x^n)d\,e^2}{3}-\frac{bd\,e^2 n\,x^9}{27}+\frac{x^9 ad\,e^2}{3}+\frac{3x^7 b\ln(c\,x^n)d^2 e}{7}-\frac{3b\,d^2 en\,x^7}{49}$
risch	$\frac{x^{11}a\,e^3}{11}+\frac{x^5 a\,d^3}{5}+\frac{3\ln(c)b\,d^2 e\,x^7}{7}+\frac{\ln(c)bd\,e^2x^9}{3}-\frac{3i\pi b\,d^2 e\,x^7\,\mathrm{csgn}(ic\,x^n)^3}{14}+\frac{i\pi b\,e^3x^{11}\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2}{22}+$

input
```
int(x^4*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/11*x^11*b*ln(c*x^n)*e^3-1/121*b*e^3*n*x^11+1/11*x^11*a*e^3+1/3*x^9*b*ln(
c*x^n)*d*e^2-1/27*b*d*e^2*n*x^9+1/3*x^9*a*d*e^2+3/7*x^7*b*ln(c*x^n)*d^2*e-
3/49*b*d^2*e*n*x^7+3/7*x^7*a*d^2*e+1/5*x^5*b*ln(c*x^n)*d^3-1/25*b*d^3*n*x^
5+1/5*x^5*a*d^3
```

3.202.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.67

$$\int x^4(d+ex^2)^3(a+b\log(cx^n))\,dx$$
$$= -\frac{1}{121}(be^3n-11\,ae^3)x^{11}-\frac{1}{27}(bde^2n-9\,ade^2)x^9-\frac{3}{49}(bd^2en-7\,ad^2e)x^7$$
$$-\frac{1}{25}(bd^3n-5\,ad^3)x^5+\frac{1}{1155}(105\,be^3x^{11}+385\,bde^2x^9+495\,bd^2ex^7+231\,bd^3x^5)\log(c)$$
$$+\frac{1}{1155}(105\,be^3nx^{11}+385\,bde^2nx^9+495\,bd^2enx^7+231\,bd^3nx^5)\log(x)$$

input
```
integrate(x^4*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/121*(b*e^3*n - 11*a*e^3)*x^11 - 1/27*(b*d*e^2*n - 9*a*d*e^2)*x^9 - 3/49
*(b*d^2*e*n - 7*a*d^2*e)*x^7 - 1/25*(b*d^3*n - 5*a*d^3)*x^5 + 1/1155*(105*
b*e^3*x^11 + 385*b*d*e^2*x^9 + 495*b*d^2*e*x^7 + 231*b*d^3*x^5)*log(c) + 1
/1155*(105*b*e^3*n*x^11 + 385*b*d*e^2*n*x^9 + 495*b*d^2*e*n*x^7 + 231*b*d^
3*n*x^5)*log(x)
```

3.202.6 Sympy [A] (verification not implemented)

Time = 2.28 (sec) , antiderivative size = 170, normalized size of antiderivative = 1.70

$$\int x^4(d+ex^2)^3(a+b\log(cx^n))\,dx = \frac{ad^3x^5}{5}+\frac{3ad^2ex^7}{7}+\frac{ade^2x^9}{3}+\frac{ae^3x^{11}}{11} - \frac{bd^3nx^5}{25}+\frac{bd^3x^5\log(cx^n)}{5}-\frac{3bd^2enx^7}{49} + \frac{3bd^2ex^7\log(cx^n)}{7}-\frac{bde^2nx^9}{27} + \frac{bde^2x^9\log(cx^n)}{3}-\frac{be^3nx^{11}}{121}+\frac{be^3x^{11}\log(cx^n)}{11}$$

input
```
integrate(x**4*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**5/5 + 3*a*d**2*e*x**7/7 + a*d*e**2*x**9/3 + a*e**3*x**11/11 - b*
d**3*n*x**5/25 + b*d**3*x**5*log(c*x**n)/5 - 3*b*d**2*e*n*x**7/49 + 3*b*d*
*2*e*x**7*log(c*x**n)/7 - b*d*e**2*n*x**9/27 + b*d*e**2*x**9*log(c*x**n)/3
 - b*e**3*n*x**11/121 + b*e**3*x**11*log(c*x**n)/11
```

3.202.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.43

$$\int x^4(d+ex^2)^3(a+b\log(cx^n))\,dx = -\frac{1}{121}be^3nx^{11}+\frac{1}{11}be^3x^{11}\log(cx^n)+\frac{1}{11}ae^3x^{11} - \frac{1}{27}bde^2nx^9+\frac{1}{3}bde^2x^9\log(cx^n)+\frac{1}{3}ade^2x^9 - \frac{3}{49}bd^2enx^7+\frac{3}{7}bd^2ex^7\log(cx^n)+\frac{3}{7}ad^2ex^7 - \frac{1}{25}bd^3nx^5+\frac{1}{5}bd^3x^5\log(cx^n)+\frac{1}{5}ad^3x^5$$

input
```
integrate(x^4*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/121*b*e^3*n*x^11 + 1/11*b*e^3*x^11*log(c*x^n) + 1/11*a*e^3*x^11 - 1/27*
b*d*e^2*n*x^9 + 1/3*b*d*e^2*x^9*log(c*x^n) + 1/3*a*d*e^2*x^9 - 3/49*b*d^2*
e*n*x^7 + 3/7*b*d^2*e*x^7*log(c*x^n) + 3/7*a*d^2*e*x^7 - 1/25*b*d^3*n*x^5
+ 1/5*b*d^3*x^5*log(c*x^n) + 1/5*a*d^3*x^5
```

3.202.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.77

$$\begin{aligned}\int x^4(d+ex^2)^3(a+b\log(cx^n))\,dx =& \frac{1}{11}be^3nx^{11}\log(x)-\frac{1}{121}be^3nx^{11}\\&+\frac{1}{11}be^3x^{11}\log(c)+\frac{1}{11}ae^3x^{11}+\frac{1}{3}bde^2nx^9\log(x)\\&-\frac{1}{27}bde^2nx^9+\frac{1}{3}bde^2x^9\log(c)+\frac{1}{3}ade^2x^9\\&+\frac{3}{7}bd^2enx^7\log(x)-\frac{3}{49}bd^2enx^7\\&+\frac{3}{7}bd^2ex^7\log(c)+\frac{3}{7}ad^2ex^7+\frac{1}{5}bd^3nx^5\log(x)\\&-\frac{1}{25}bd^3nx^5+\frac{1}{5}bd^3x^5\log(c)+\frac{1}{5}ad^3x^5\end{aligned}$$

input
```
integrate(x^4*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/11*b*e^3*n*x^11*log(x) - 1/121*b*e^3*n*x^11 + 1/11*b*e^3*x^11*log(c) + 1
/11*a*e^3*x^11 + 1/3*b*d*e^2*n*x^9*log(x) - 1/27*b*d*e^2*n*x^9 + 1/3*b*d*e
^2*x^9*log(c) + 1/3*a*d*e^2*x^9 + 3/7*b*d^2*e*n*x^7*log(x) - 3/49*b*d^2*e*
n*x^7 + 3/7*b*d^2*e*x^7*log(c) + 3/7*a*d^2*e*x^7 + 1/5*b*d^3*n*x^5*log(x)
- 1/25*b*d^3*n*x^5 + 1/5*b*d^3*x^5*log(c) + 1/5*a*d^3*x^5
```

3.202.9 Mupad [B] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.13

$$\int x^4\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)\,dx=\ln\left(c\,x^n\right)\,\left(\frac{b\,d^3\,x^5}{5}+\frac{3\,b\,d^2\,e\,x^7}{7}+\frac{b\,d\,e^2\,x^9}{3}+\frac{b\,e^3\,x^{11}}{11}\right)+\frac{d^3\,x^5\,\left(5\,a-b\,n\right)}{25}+\frac{e^3\,x^{11}\,\left(11\,a-b\,n\right)}{121}+\frac{3\,d^2\,e\,x^7\,\left(7\,a-b\,n\right)}{49}+\frac{d\,e^2\,x^9\,\left(9\,a-b\,n\right)}{27}$$

input
```
int(x^4*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^3*x^5)/5 + (b*e^3*x^11)/11 + (3*b*d^2*e*x^7)/7 + (b*d*e^2
*x^9)/3) + (d^3*x^5*(5*a - b*n))/25 + (e^3*x^11*(11*a - b*n))/121 + (3*d^2
*e*x^7*(7*a - b*n))/49 + (d*e^2*x^9*(9*a - b*n))/27
```

3.203 $\int x^2(d+ex^2)^3 (a+b\log(cx^n))\,dx$

3.203.1 Optimal result

Integrand size = 23, antiderivative size = 100

$$\int x^2(d+ex^2)^3 (a+b\log(cx^n))\,dx = -\frac{1}{9}bd^3nx^3-\frac{3}{25}bd^2enx^5-\frac{3}{49}bde^2nx^7-\frac{1}{81}be^3nx^9+\frac{1}{315}\left(105d^3x^3+189d^2ex^5+135de^2x^7+35e^3x^9\right)(a+b\log(cx^n))$$

output
```
-1/9*b*d^3*n*x^3-3/25*b*d^2*e*n*x^5-3/49*b*d*e^2*n*x^7-1/81*b*e^3*n*x^9+1/
315*(35*e^3*x^9+135*d*e^2*x^7+189*d^2*e*x^5+105*d^3*x^3)*(a+b*ln(c*x^n))
```

3.203.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.33

$$\int x^2(d+ex^2)^3 (a+b\log(cx^n))\,dx = -\frac{1}{9}bd^3nx^3-\frac{3}{25}bd^2enx^5-\frac{3}{49}bde^2nx^7-\frac{1}{81}be^3nx^9+\frac{1}{3}d^3x^3(a+b\log(cx^n))+\frac{3}{5}d^2ex^5(a+b\log(cx^n))+\frac{3}{7}de^2x^7(a+b\log(cx^n))+\frac{1}{9}e^3x^9(a+b\log(cx^n))$$

input
```
Integrate[x^2*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/9*(b*d^3*n*x^3) - (3*b*d^2*e*n*x^5)/25 - (3*b*d*e^2*n*x^7)/49 - (b*e^3*
n*x^9)/81 + (d^3*x^3*(a + b*Log[c*x^n]))/3 + (3*d^2*e*x^5*(a + b*Log[c*x^n
]))/5 + (3*d*e^2*x^7*(a + b*Log[c*x^n]))/7 + (e^3*x^9*(a + b*Log[c*x^n]))/
9
```

3.203.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 97, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2771, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2 (d+ex^2)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{315}\left(105d^3x^3+189d^2ex^5+135de^2x^7+35e^3x^9\right)(a+b\log(cx^n))-bn\int\left(\frac{e^3x^8}{9}+\frac{3}{7}de^2x^6+\frac{3}{5}d^2ex^4+\frac{d^3x^2}{3}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{315}\left(105d^3x^3+189d^2ex^5+135de^2x^7+35e^3x^9\right)(a+b\log(cx^n))-bn\left(\frac{d^3x^3}{9}+\frac{3}{25}d^2ex^5+\frac{3}{49}de^2x^7+\frac{e^3x^9}{81}\right)$$

input
```
Int[x^2*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d^3*x^3)/9 + (3*d^2*e*x^5)/25 + (3*d*e^2*x^7)/49 + (e^3*x^9)/81))
+ ((105*d^3*x^3 + 189*d^2*e*x^5 + 135*d*e^2*x^7 + 35*e^3*x^9)*(a + b*Log[c
*x^n]))/315
```

3.203.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.203.4 Maple [A] (verified)

Time = 0.81 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.44

method	result
parallelrisch	$\frac{x^9 b\ln(c\,x^n) e^3}{9}-\frac{b\,e^3 n\,x^9}{81}+\frac{x^9 a\,e^3}{9}+\frac{3x^7 b\ln(c\,x^n) d\,e^2}{7}-\frac{3bd\,e^2 n\,x^7}{49}+\frac{3x^7 ad\,e^2}{7}+\frac{3x^5\ln(c\,x^n) b\,d^2 e}{5}-\frac{3b\,d^2 en\,x^5}{25}$
risch	$\frac{a\,d^3x^3}{3}+\frac{3a\,d^2e\,x^5}{5}+\frac{x^9 a\,e^3}{9}+\frac{3\ln(c)bd\,e^2x^7}{7}+\frac{i\pi b\,d^3x^3\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2}{6}-\frac{3i\pi bd\,e^2x^7\,\mathrm{csgn}(ic\,x^n)^3}{14}-\frac{i\pi b\,d^3x^3}{}$

input
```
int(x^2*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/9*x^9*b*ln(c*x^n)*e^3-1/81*b*e^3*n*x^9+1/9*x^9*a*e^3+3/7*x^7*b*ln(c*x^n)
*d*e^2-3/49*b*d*e^2*n*x^7+3/7*x^7*a*d*e^2+3/5*x^5*ln(c*x^n)*b*d^2*e-3/25*b
*d^2*e*n*x^5+3/5*a*d^2*e*x^5+1/3*x^3*b*ln(c*x^n)*d^3-1/9*b*d^3*n*x^3+1/3*a
*d^3*x^3
```

3.203.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.67

$$\begin{aligned}\int x^2(d+ex^2)^3(a+b\log(cx^n))\,dx &= -\frac{1}{81}(be^3n-9ae^3)x^9-\frac{3}{49}(bde^2n-7ade^2)x^7-\frac{3}{25}(bd^2en-5ad^2e)x^5\\&\quad-\frac{1}{9}(bd^3n-3ad^3)x^3+\frac{1}{315}(35be^3x^9+135bde^2x^7+189bd^2ex^5+105bd^3x^3)\log(c)\\&\quad+\frac{1}{315}(35be^3nx^9+135bde^2nx^7+189bd^2enx^5+105bd^3nx^3)\log(x)\end{aligned}$$

input
```
integrate(x^2*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/81*(b*e^3*n - 9*a*e^3)*x^9 - 3/49*(b*d*e^2*n - 7*a*d*e^2)*x^7 - 3/25*(b
*d^2*e*n - 5*a*d^2*e)*x^5 - 1/9*(b*d^3*n - 3*a*d^3)*x^3 + 1/315*(35*b*e^3*
x^9 + 135*b*d*e^2*x^7 + 189*b*d^2*e*x^5 + 105*b*d^3*x^3)*log(c) + 1/315*(3
5*b*e^3*n*x^9 + 135*b*d*e^2*n*x^7 + 189*b*d^2*e*n*x^5 + 105*b*d^3*n*x^3)*l
og(x)
```

3.203.6 Sympy [A] (verification not implemented)

Time = 1.25 (sec) , antiderivative size = 175, normalized size of antiderivative = 1.75

$$\int x^2 (d+ex^2)^3 (a+b\log(cx^n))\,dx = \frac{ad^3x^3}{3} + \frac{3ad^2ex^5}{5} + \frac{3ade^2x^7}{7} + \frac{ae^3x^9}{9} - \frac{bd^3nx^3}{9} + \frac{bd^3x^3\log(cx^n)}{3} - \frac{3bd^2enx^5}{25} + \frac{3bd^2ex^5\log(cx^n)}{5} - \frac{3bde^2nx^7}{49} + \frac{3bde^2x^7\log(cx^n)}{7} - \frac{be^3nx^9}{81} + \frac{be^3x^9\log(cx^n)}{9}$$

input
```
integrate(x**2*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**3/3 + 3*a*d**2*e*x**5/5 + 3*a*d*e**2*x**7/7 + a*e**3*x**9/9 - b*
d**3*n*x**3/9 + b*d**3*x**3*log(c*x**n)/3 - 3*b*d**2*e*n*x**5/25 + 3*b*d**
2*e*x**5*log(c*x**n)/5 - 3*b*d*e**2*n*x**7/49 + 3*b*d*e**2*x**7*log(c*x**n
)/7 - b*e**3*n*x**9/81 + b*e**3*x**9*log(c*x**n)/9
```

3.203.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.43

$$\int x^2 (d+ex^2)^3 (a+b\log(cx^n))\,dx = -\frac{1}{81}be^3nx^9 + \frac{1}{9}be^3x^9\log(cx^n) + \frac{1}{9}ae^3x^9 - \frac{3}{49}bde^2nx^7 + \frac{3}{7}bde^2x^7\log(cx^n) + \frac{3}{7}ade^2x^7 - \frac{3}{25}bd^2enx^5 + \frac{3}{5}bd^2ex^5\log(cx^n) + \frac{3}{5}ad^2ex^5 - \frac{1}{9}bd^3nx^3 + \frac{1}{3}bd^3x^3\log(cx^n) + \frac{1}{3}ad^3x^3$$

input
```
integrate(x^2*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/81*b*e^3*n*x^9 + 1/9*b*e^3*x^9*log(c*x^n) + 1/9*a*e^3*x^9 - 3/49*b*d*e^
2*n*x^7 + 3/7*b*d*e^2*x^7*log(c*x^n) + 3/7*a*d*e^2*x^7 - 3/25*b*d^2*e*n*x^
5 + 3/5*b*d^2*e*x^5*log(c*x^n) + 3/5*a*d^2*e*x^5 - 1/9*b*d^3*n*x^3 + 1/3*b
*d^3*x^3*log(c*x^n) + 1/3*a*d^3*x^3
```

3.203.8 Giac [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.77

$$\int x^2 (d+ex^2)^3 (a+b\log(cx^n)) \, dx = \frac{1}{9} be^3nx^9\log(x) - \frac{1}{81} be^3nx^9 + \frac{1}{9} be^3x^9\log(c) + \frac{1}{9} ae^3x^9 + \frac{3}{7} bde^2nx^7\log(x) - \frac{3}{49} bde^2nx^7 + \frac{3}{7} bde^2x^7\log(c) + \frac{3}{7} ade^2x^7 + \frac{3}{5} bd^2enx^5\log(x) - \frac{3}{25} bd^2enx^5 + \frac{3}{5} bd^2ex^5\log(c) + \frac{3}{5} ad^2ex^5 + \frac{1}{3} bd^3nx^3\log(x) - \frac{1}{9} bd^3nx^3 + \frac{1}{3} bd^3x^3\log(c) + \frac{1}{3} ad^3x^3$$

input
```
integrate(x^2*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/9*b*e^3*n*x^9*log(x) - 1/81*b*e^3*n*x^9 + 1/9*b*e^3*x^9*log(c) + 1/9*a*e
^3*x^9 + 3/7*b*d*e^2*n*x^7*log(x) - 3/49*b*d*e^2*n*x^7 + 3/7*b*d*e^2*x^7*l
og(c) + 3/7*a*d*e^2*x^7 + 3/5*b*d^2*e*n*x^5*log(x) - 3/25*b*d^2*e*n*x^5 +
3/5*b*d^2*e*x^5*log(c) + 3/5*a*d^2*e*x^5 + 1/3*b*d^3*n*x^3*log(x) - 1/9*b*
d^3*n*x^3 + 1/3*b*d^3*x^3*log(c) + 1/3*a*d^3*x^3
```

3.203.9 Mupad [B] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 113, normalized size of antiderivative = 1.13

$$\int x^2 (d+ex^2)^3 (a+b\log(cx^n)) \, dx = \ln(c\,x^n) \left(\frac{b\,d^3\,x^3}{3} + \frac{3\,b\,d^2\,e\,x^5}{5} + \frac{3\,b\,d\,e^2\,x^7}{7} + \frac{b\,e^3\,x^9}{9}\right) + \frac{d^3\,x^3\,(3\,a-b\,n)}{9} + \frac{e^3\,x^9\,(9\,a-b\,n)}{81} + \frac{3\,d^2\,e\,x^5\,(5\,a-b\,n)}{25} + \frac{3\,d\,e^2\,x^7\,(7\,a-b\,n)}{49}$$

input
```
int(x^2*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*d^3*x^3)/3 + (b*e^3*x^9)/9 + (3*b*d^2*e*x^5)/5 + (3*b*d*e^2
*x^7)/7) + (d^3*x^3*(3*a - b*n))/9 + (e^3*x^9*(9*a - b*n))/81 + (3*d^2*e*x
^5*(5*a - b*n))/25 + (3*d*e^2*x^7*(7*a - b*n))/49
```

3.203. $\int x^2(d+ex^2)^3\left(a+b\log\left(cx^n\right)\right)\,dx$

3.204 $\int (d+ex^2)^3 (a+b\log(cx^n))\,dx$

3.204.1 Optimal result

Integrand size = 20, antiderivative size = 121

$$\int (d+ex^2)^3 (a+b\log(cx^n))\,dx = -bd^3nx-\frac{1}{3}bd^2enx^3-\frac{3}{25}bde^2nx^5-\frac{1}{49}be^3nx^7 + d^3x(a+b\log(cx^n))+d^2ex^3(a+b\log(cx^n)) + \frac{3}{5}de^2x^5(a+b\log(cx^n))+\frac{1}{7}e^3x^7(a+b\log(cx^n))$$

output
```
-b*d^3*n*x-1/3*b*d^2*e*n*x^3-3/25*b*d*e^2*n*x^5-1/49*b*e^3*n*x^7+d^3*x*(a+
b*ln(c*x^n))+d^2*e*x^3*(a+b*ln(c*x^n))+3/5*d*e^2*x^5*(a+b*ln(c*x^n))+1/7*e
^3*x^7*(a+b*ln(c*x^n))
```

3.204.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.02

$$\int (d+ex^2)^3 (a+b\log(cx^n))\,dx = ad^3x-bd^3nx-\frac{1}{3}bd^2enx^3-\frac{3}{25}bde^2nx^5-\frac{1}{49}be^3nx^7 + bd^3x\log(cx^n)+d^2ex^3(a+b\log(cx^n)) + \frac{3}{5}de^2x^5(a+b\log(cx^n))+\frac{1}{7}e^3x^7(a+b\log(cx^n))$$

input
```
Integrate[(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
a*d^3*x - b*d^3*n*x - (b*d^2*e*n*x^3)/3 - (3*b*d*e^2*n*x^5)/25 - (b*e^3*n*
x^7)/49 + b*d^3*x*Log[c*x^n] + d^2*e*x^3*(a + b*Log[c*x^n]) + (3*d*e^2*x^5
*(a + b*Log[c*x^n]))/5 + (e^3*x^7*(a + b*Log[c*x^n]))/7
```

3.204.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 117, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2750, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^2)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2750}$$

$$-bn\int\left(\frac{e^3x^6}{7}+\frac{3}{5}de^2x^4+d^2ex^2+d^3\right)dx+d^3x(a+b\log(cx^n))+d^2ex^3(a+b\log(cx^n))+\frac{3}{5}de^2x^5(a+b\log(cx^n))+\frac{1}{7}e^3x^7(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$d^3x(a+b\log(cx^n))+d^2ex^3(a+b\log(cx^n))+\frac{3}{5}de^2x^5(a+b\log(cx^n))+\frac{1}{7}e^3x^7(a+b\log(cx^n))-bn\left(d^3x+\frac{1}{3}d^2ex^3+\frac{3}{25}de^2x^5+\frac{e^3x^7}{49}\right)$$

input
```
Int[(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*(d^3*x + (d^2*e*x^3)/3 + (3*d*e^2*x^5)/25 + (e^3*x^7)/49)) + d^3*x*(
a + b*Log[c*x^n]) + d^2*e*x^3*(a + b*Log[c*x^n]) + (3*d*e^2*x^5*(a + b*Log
[c*x^n]))/5 + (e^3*x^7*(a + b*Log[c*x^n]))/7
```

3.204.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

3.204.4 Maple [A] (verified)

Time = 0.63 (sec) , antiderivative size = 134, normalized size of antiderivative = 1.11

method	result
parallelrisch	$\frac{x^7\ln(c\,x^n)b\,e^3}{7}-\frac{b\,e^3n\,x^7}{49}+\frac{a\,e^3x^7}{7}+\frac{3x^5b\ln(c\,x^n)d\,e^2}{5}-\frac{3bd\,e^2n\,x^5}{25}+\frac{3x^5ad\,e^2}{5}+x^3b\ln\left(c\,x^n\right)d^2e-\frac{b\,d^2en\,}{3}$
risch	$\frac{a\,e^3x^7}{7}+\ln\left(c\right)b\,d^2e\,x^3-\frac{i\pi b\,d^2e\,x^3\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)}{2}+\frac{i\pi b\,e^3x^7\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2}{14}+\frac{i\pi b\,e^3x^7\,\mathrm{csgn}}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/7*x^7*ln(c*x^n)*b*e^3-1/49*b*e^3*n*x^7+1/7*a*e^3*x^7+3/5*x^5*b*ln(c*x^n)
*d*e^2-3/25*b*d*e^2*n*x^5+3/5*x^5*a*d*e^2+x^3*b*ln(c*x^n)*d^2*e-1/3*b*d^2*
e*n*x^3+x^3*a*d^2*e+x*b*ln(c*x^n)*d^3-b*d^3*n*x+a*d^3*x
```

3.204.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 161, normalized size of antiderivative = 1.33

$$\begin{aligned}\int \left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)\,dx &= -\frac{1}{49}\left(be^3n-7\,ae^3\right)x^7-\frac{3}{25}\left(bde^2n-5\,ade^2\right)x^5-\frac{1}{3}\left(bd^2en-3\,ad^2e\right)x^3\\&\quad-\left(bd^3n-ad^3\right)x+\frac{1}{35}\left(5\,be^3x^7+21\,bde^2x^5+35\,bd^2ex^3+35\,bd^3x\right)\log\left(c\right)\\&\quad+\frac{1}{35}\left(5\,be^3nx^7+21\,bde^2nx^5+35\,bd^2enx^3+35\,bd^3nx\right)\log\left(x\right)\end{aligned}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
-1/49*(b*e^3*n - 7*a*e^3)*x^7 - 3/25*(b*d*e^2*n - 5*a*d*e^2)*x^5 - 1/3*(b*
d^2*e*n - 3*a*d^2*e)*x^3 - (b*d^3*n - a*d^3)*x + 1/35*(5*b*e^3*x^7 + 21*b*
d*e^2*x^5 + 35*b*d^2*e*x^3 + 35*b*d^3*x)*log(c) + 1/35*(5*b*e^3*n*x^7 + 21
*b*d*e^2*n*x^5 + 35*b*d^2*e*n*x^3 + 35*b*d^3*n*x)*log(x)
```

3.204.6 Sympy [A] (verification not implemented)

Time = 0.68 (sec) , antiderivative size = 156, normalized size of antiderivative = 1.29

$$\int \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx = ad^3x+ad^2ex^3+\frac{3ade^2x^5}{5}+\frac{ae^3x^7}{7}-bd^3nx+bd^3x\log(cx^n)-\frac{bd^2enx^3}{3}+bd^2ex^3\log(cx^n)-\frac{3bde^2nx^5}{25}+\frac{3bde^2x^5\log(cx^n)}{5}-\frac{be^3nx^7}{49}+\frac{be^3x^7\log(cx^n)}{7}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x + a*d**2*e*x**3 + 3*a*d*e**2*x**5/5 + a*e**3*x**7/7 - b*d**3*n*x
+ b*d**3*x*log(c*x**n) - b*d**2*e*n*x**3/3 + b*d**2*e*x**3*log(c*x**n) - 3
*b*d*e**2*n*x**5/25 + 3*b*d*e**2*x**5*log(c*x**n)/5 - b*e**3*n*x**7/49 + b
*e**3*x**7*log(c*x**n)/7
```

3.204.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.10

$$\int \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx = -\frac{1}{49}\,be^3nx^7+\frac{1}{7}\,be^3x^7\log(cx^n)+\frac{1}{7}\,ae^3x^7-\frac{3}{25}\,bde^2nx^5+\frac{3}{5}\,bde^2x^5\log(cx^n)+\frac{3}{5}\,ade^2x^5-\frac{1}{3}\,bd^2enx^3+bd^2ex^3\log(cx^n)+ad^2ex^3-bd^3nx+bd^3x\log(cx^n)+ad^3x$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/49*b*e^3*n*x^7 + 1/7*b*e^3*x^7*log(c*x^n) + 1/7*a*e^3*x^7 - 3/25*b*d*e^
2*n*x^5 + 3/5*b*d*e^2*x^5*log(c*x^n) + 3/5*a*d*e^2*x^5 - 1/3*b*d^2*e*n*x^3
 + b*d^2*e*x^3*log(c*x^n) + a*d^2*e*x^3 - b*d^3*n*x + b*d^3*x*log(c*x^n) +
 a*d^3*x
```

3.204.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.35

$$\int (d+ex^2)^3 (a+b\log(cx^n))\,dx = \frac{1}{7}be^3nx^7\log(x) - \frac{1}{49}be^3nx^7 + \frac{1}{7}be^3x^7\log(c) + \frac{1}{7}ae^3x^7 + \frac{3}{5}bde^2nx^5\log(x) - \frac{3}{25}bde^2nx^5 + \frac{3}{5}bde^2x^5\log(c) + \frac{3}{5}ade^2x^5 + bd^2enx^3\log(x) - \frac{1}{3}bd^2enx^3 + bd^2ex^3\log(c) + ad^2ex^3 + bd^3nx\log(x) - bd^3nx + bd^3x\log(c) + ad^3x$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/7*b*e^3*n*x^7*log(x) - 1/49*b*e^3*n*x^7 + 1/7*b*e^3*x^7*log(c) + 1/7*a*e
^3*x^7 + 3/5*b*d*e^2*n*x^5*log(x) - 3/25*b*d*e^2*n*x^5 + 3/5*b*d*e^2*x^5*l
og(c) + 3/5*a*d*e^2*x^5 + b*d^2*e*n*x^3*log(x) - 1/3*b*d^2*e*n*x^3 + b*d^2
*e*x^3*log(c) + a*d^2*e*x^3 + b*d^3*n*x*log(x) - b*d^3*n*x + b*d^3*x*log(c
) + a*d^3*x
```

3.204.9 Mupad [B] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 104, normalized size of antiderivative = 0.86

$$\int (d+ex^2)^3 (a+b\log(cx^n))\,dx = \ln(c\,x^n)\left(b\,d^3\,x + b\,d^2\,e\,x^3 + \frac{3\,b\,d\,e^2\,x^5}{5} + \frac{b\,e^3\,x^7}{7}\right) + \frac{e^3\,x^7\,(7\,a-b\,n)}{49} + d^3\,x\,(a-b\,n) + \frac{d^2\,e\,x^3\,(3\,a-b\,n)}{3} + \frac{3\,d\,e^2\,x^5\,(5\,a-b\,n)}{25}$$

input
```
int((d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
log(c*x^n)*((b*e^3*x^7)/7 + b*d^3*x + b*d^2*e*x^3 + (3*b*d*e^2*x^5)/5) + (
e^3*x^7*(7*a - b*n))/49 + d^3*x*(a - b*n) + (d^2*e*x^3*(3*a - b*n))/3 + (3
*d*e^2*x^5*(5*a - b*n))/25
```

3.204. $\int (d+ex^2)^3 (a+b\log(cx^n))\,dx$

3.205 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^2}\,dx$

3.205.1 Optimal result

Integrand size = 23, antiderivative size = 118

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^3n}{x} - 3bd^2enx - \frac{1}{3}bde^2nx^3 - \frac{1}{25}be^3nx^5 - \frac{d^3(a+b\log(cx^n))}{x} + 3d^2ex(a+b\log(cx^n)) + de^2x^3(a+b\log(cx^n)) + \frac{1}{5}e^3x^5(a+b\log(cx^n))$$

output
```
-b*d^3*n/x-3*b*d^2*e*n*x-1/3*b*d*e^2*n*x^3-1/25*b*e^3*n*x^5-d^3*(a+b*ln(c*
x^n))/x+3*d^2*e*x*(a+b*ln(c*x^n))+d*e^2*x^3*(a+b*ln(c*x^n))+1/5*e^3*x^5*(a
+b*ln(c*x^n))
```

3.205.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 123, normalized size of antiderivative = 1.04

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^3n}{x} + 3ad^2ex - 3bd^2enx - \frac{1}{3}bde^2nx^3 - \frac{1}{25}be^3nx^5 + 3bd^2ex\log(cx^n) - \frac{d^3(a+b\log(cx^n))}{x} + de^2x^3(a+b\log(cx^n)) + \frac{1}{5}e^3x^5(a+b\log(cx^n))$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((b*d^3*n)/x) + 3*a*d^2*e*x - 3*b*d^2*e*n*x - (b*d*e^2*n*x^3)/3 - (b*e^3*
n*x^5)/25 + 3*b*d^2*e*x*Log[c*x^n] - (d^3*(a + b*Log[c*x^n]))/x + d*e^2*x^
3*(a + b*Log[c*x^n]) + (e^3*x^5*(a + b*Log[c*x^n]))/5
```

3.205.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 114, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^2} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(\frac{e^3x^4}{5}+de^2x^2+3d^2e-\frac{d^3}{x^2}\right)dx-\frac{d^3(a+b\log(cx^n))}{x}+3d^2ex(a+b\log(cx^n))+de^2x^3(a+b\log(cx^n))+\frac{1}{5}e^3x^5(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{x}+3d^2ex(a+b\log(cx^n))+de^2x^3(a+b\log(cx^n))+\frac{1}{5}e^3x^5(a+b\log(cx^n))-bn\left(\frac{d^3}{x}+3d^2ex+\frac{1}{3}de^2x^3+\frac{e^3x^5}{25}\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-(b*n*(d^3/x + 3*d^2*e*x + (d*e^2*x^3)/3 + (e^3*x^5)/25)) - (d^3*(a + b*Lo
g[c*x^n]))/x + 3*d^2*e*x*(a + b*Log[c*x^n]) + d*e^2*x^3*(a + b*Log[c*x^n])
 + (e^3*x^5*(a + b*Log[c*x^n]))/5
```

3.205.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.205.4 Maple [A] (verified)

Time = 0.68 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.19

method	result
parallelrisch	$-\frac{-15x^6b\ln(c\,x^n)e^3+3b\,e^3n\,x^6-15x^6a\,e^3-75x^4b\ln(c\,x^n)d\,e^2+25bd\,e^2n\,x^4-75x^4ad\,e^2-225b\ln(c\,x^n)d^2e\,x^2+225b\,d^2en\,x^2-2}{75x}$
risch	$-\frac{b(-e^3x^6-5e^2d\,x^4-15d^2e\,x^2+5d^3)\ln(x^n)}{5x}-\frac{-30x^6a\,e^3-150\ln(c)bd\,e^2x^4+75i\pi bd\,e^2x^4\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)+22}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-1/75/x*(-15*x^6*b*ln(c*x^n)*e^3+3*b*e^3*n*x^6-15*x^6*a*e^3-75*x^4*b*ln(c*
x^n)*d*e^2+25*b*d*e^2*n*x^4-75*x^4*a*d*e^2-225*b*ln(c*x^n)*d^2*e*x^2+225*b
*d^2*e*n*x^2-225*a*d^2*e*x^2+75*b*ln(c*x^n)*d^3+75*b*d^3*n+75*a*d^3)
```

3.205.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 159, normalized size of antiderivative = 1.35

$$\int \frac{(d+ex^2)^3\,(a+b\log{(cx^n)})}{x^2}\,dx = -\frac{3\,(be^3n-5\,ae^3)x^6+75\,bd^3n+25\,(bde^2n-3\,ade^2)x^4+75\,ad^3+225\,(bd^2en-ad^2e)x^2-15\,(be^3x^6+5}{75\,x}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
-1/75*(3*(b*e^3*n - 5*a*e^3)*x^6 + 75*b*d^3*n + 25*(b*d*e^2*n - 3*a*d*e^2)
*x^4 + 75*a*d^3 + 225*(b*d^2*e*n - a*d^2*e)*x^2 - 15*(b*e^3*x^6 + 5*b*d*e^
2*x^4 + 15*b*d^2*e*x^2 - 5*b*d^3)*log(c) - 15*(b*e^3*n*x^6 + 5*b*d*e^2*n*x
^4 + 15*b*d^2*e*n*x^2 - 5*b*d^3*n)*log(x))/x
```

3.205.6 Sympy [A] (verification not implemented)

Time = 0.63 (sec) , antiderivative size = 146, normalized size of antiderivative = 1.24

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^2}\,dx = -\frac{ad^3}{x} + 3ad^2ex + ade^2x^3 + \frac{ae^3x^5}{5} - \frac{bd^3n}{x} - \frac{bd^3\log(cx^n)}{x} - 3bd^2enx + 3bd^2ex\log(cx^n) - \frac{bde^2nx^3}{3} + bde^2x^3\log(cx^n) - \frac{be^3nx^5}{25} + \frac{be^3x^5\log(cx^n)}{5}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**2,x)
```

output
```
-a*d**3/x + 3*a*d**2*e*x + a*d*e**2*x**3 + a*e**3*x**5/5 - b*d**3*n/x - b*
d**3*log(c*x**n)/x - 3*b*d**2*e*n*x + 3*b*d**2*e*x*log(c*x**n) - b*d*e**2*
n*x**3/3 + b*d*e**2*x**3*log(c*x**n) - b*e**3*n*x**5/25 + b*e**3*x**5*log(
c*x**n)/5
```

3.205.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.14

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^2}\,dx = -\frac{1}{25}be^3nx^5 + \frac{1}{5}be^3x^5\log(cx^n) + \frac{1}{5}ae^3x^5 - \frac{1}{3}bde^2nx^3 + bde^2x^3\log(cx^n) + ade^2x^3 - 3bd^2enx + 3bd^2ex\log(cx^n) + 3ad^2ex - \frac{bd^3n}{x} - \frac{bd^3\log(cx^n)}{x} - \frac{ad^3}{x}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
-1/25*b*e^3*n*x^5 + 1/5*b*e^3*x^5*log(c*x^n) + 1/5*a*e^3*x^5 - 1/3*b*d*e^2
*n*x^3 + b*d*e^2*x^3*log(c*x^n) + a*d*e^2*x^3 - 3*b*d^2*e*n*x + 3*b*d^2*e*
x*log(c*x^n) + 3*a*d^2*e*x - b*d^3*n/x - b*d^3*log(c*x^n)/x - a*d^3/x
```

3.205.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 151, normalized size of antiderivative = 1.28

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^2}\,dx = -\frac{1}{25}\left(be^3n - 5\,be^3\log(c) - 5\,ae^3\right)x^5 - \frac{1}{3}\left(bde^2n - 3\,bde^2\log(c) - 3\,ade^2\right)x^3 - 3\left(bd^2en - bd^2e\log(c) - ad^2e\right)x + \frac{1}{5}\left(be^3nx^5 + 5\,bde^2nx^3 + 15\,bd^2enx - \frac{5\,bd^3n}{x}\right)\log(x) - \frac{bd^3n + bd^3\log(c) + ad^3}{x}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
-1/25*(b*e^3*n - 5*b*e^3*log(c) - 5*a*e^3)*x^5 - 1/3*(b*d*e^2*n - 3*b*d*e^
2*log(c) - 3*a*d*e^2)*x^3 - 3*(b*d^2*e*n - b*d^2*e*log(c) - a*d^2*e)*x + 1
/5*(b*e^3*n*x^5 + 5*b*d*e^2*n*x^3 + 15*b*d^2*e*n*x - 5*b*d^3*n/x)*log(x) -
 (b*d^3*n + b*d^3*log(c) + a*d^3)/x
```

3.205.9 Mupad [B] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 145, normalized size of antiderivative = 1.23

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^2}\,dx = \ln(c\,x^n)\left(\frac{6\,b\,d^2\,e\,x^2 + 4\,b\,d\,e^2\,x^4 + \frac{6\,b\,e^3\,x^6}{5}}{x} - \frac{b\,d^3 + 3\,b\,d^2\,e\,x^2 + 3\,b\,d\,e^2\,x^4 + b\,e^3\,x^6}{x}\right) - \frac{a\,d^3 + b\,d^3\,n}{x} + \frac{e^3\,x^5\,(5\,a - b\,n)}{25} + \frac{d\,e^2\,x^3\,(3\,a - b\,n)}{3} + 3\,d^2\,e\,x\,(a - b\,n)$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^2,x)
```

output
```
log(c*x^n)*(((6*b*e^3*x^6)/5 + 6*b*d^2*e*x^2 + 4*b*d*e^2*x^4)/x - (b*d^3 +
 b*e^3*x^6 + 3*b*d^2*e*x^2 + 3*b*d*e^2*x^4)/x) - (a*d^3 + b*d^3*n)/x + (e^
3*x^5*(5*a - b*n))/25 + (d*e^2*x^3*(3*a - b*n))/3 + 3*d^2*e*x*(a - b*n)
```

3.206 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^4}\,dx$

3.206.1 Optimal result

Integrand size = 23, antiderivative size = 121

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^4}\,dx = -\frac{bd^3n}{9x^3}-\frac{3bd^2en}{x}-3bde^2nx-\frac{1}{9}be^3nx^3-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2x(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))$$

output
```
-1/9*b*d^3*n/x^3-3*b*d^2*e*n/x-3*b*d*e^2*n*x-1/9*b*e^3*n*x^3-1/3*d^3*(a+b*
ln(c*x^n))/x^3-3*d^2*e*(a+b*ln(c*x^n))/x+3*d*e^2*x*(a+b*ln(c*x^n))+1/3*e^3
*x^3*(a+b*ln(c*x^n))
```

3.206.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 112, normalized size of antiderivative = 0.93

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^4}\,dx = -\frac{3a(d^3+9d^2ex^2-9de^2x^4-e^3x^6)+bn(d^3+27d^2ex^2+27de^2x^4+e^3x^6)+3b(d^3+9d^2ex^2-9de^2x^4-e}{9x^3}$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/9*(3*a*(d^3 + 9*d^2*e*x^2 - 9*d*e^2*x^4 - e^3*x^6) + b*n*(d^3 + 27*d^2*
e*x^2 + 27*d*e^2*x^4 + e^3*x^6) + 3*b*(d^3 + 9*d^2*e*x^2 - 9*d*e^2*x^4 - e
^3*x^6)*Log[c*x^n])/x^3
```

3.206.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 120, normalized size of antiderivative = 0.99, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2772, 27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d+ex^2\right)^3 (a+b\log(cx^n))}{x^4}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \frac{1}{3}\left(-\frac{d^3}{x^4}-\frac{9ed^2}{x^2}+9e^2d+e^3x^2\right)dx-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2x(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))$$

$$\Big\downarrow \text{27}$$

$$-\frac{1}{3}bn\int \left(-\frac{d^3}{x^4}-\frac{9ed^2}{x^2}+9e^2d+e^3x^2\right)dx-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2x(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2e(a+b\log(cx^n))}{x}+3de^2x(a+b\log(cx^n))+\frac{1}{3}e^3x^3(a+b\log(cx^n))-\frac{1}{3}bn\left(\frac{d^3}{3x^3}+\frac{9d^2e}{x}+9de^2x+\frac{e^3x^3}{3}\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/3*(b*n*(d^3/(3*x^3) + (9*d^2*e)/x + 9*d*e^2*x + (e^3*x^3)/3)) - (d^3*(a
 + b*Log[c*x^n]))/(3*x^3) - (3*d^2*e*(a + b*Log[c*x^n]))/x + 3*d*e^2*x*(a
+ b*Log[c*x^n]) + (e^3*x^3*(a + b*Log[c*x^n]))/3
```

3.206.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.206.4 Maple [A] (verified)

Time = 0.65 (sec) , antiderivative size = 138, normalized size of antiderivative = 1.14

method	result
parallelrisch	$-\frac{-3x^6 b\ln(c\,x^n)e^3+b\,e^3 n\,x^6-3x^6 a\,e^3-27x^4 b\ln(c\,x^n)d\,e^2+27bd\,e^2 n\,x^4-27x^4 ad\,e^2+27b\ln(c\,x^n)d^2 e\,x^2+27b\,d^2 en\,x^2+27a\,d^2}{9x^3}$
risch	$-\frac{b(-e^3x^6-9e^2d\,x^4+9d^2e\,x^2+d^3)\ln(x^n)}{3x^3}-\frac{-6x^6 a\,e^3-54\ln(c)bd\,e^2x^4+27i\pi bd\,e^2x^4\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)-27ie\pi b}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/9/x^3*(-3*x^6*b*ln(c*x^n)*e^3+b*e^3*n*x^6-3*x^6*a*e^3-27*x^4*b*ln(c*x^n
)*d*e^2+27*b*d*e^2*n*x^4-27*x^4*a*d*e^2+27*b*ln(c*x^n)*d^2*e*x^2+27*b*d^2*
e*n*x^2+27*a*d^2*e*x^2+3*b*ln(c*x^n)*d^3+b*d^3*n+3*a*d^3)
```

3.206.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 156, normalized size of antiderivative = 1.29

$$\int \frac{(d+ex^2)^3\,(a+b\log{(cx^n)})}{x^4}\,dx =$$
$$-\frac{(be^3n-3\,ae^3)x^6+bd^3n+27\,(bde^2n-ade^2)x^4+3\,ad^3+27\,(bd^2en+ad^2e)x^2-3\,(be^3x^6+9\,bde^2x^4-}{9\,x^3}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/9*((b*e^3*n - 3*a*e^3)*x^6 + b*d^3*n + 27*(b*d*e^2*n - a*d*e^2)*x^4 + 3
*a*d^3 + 27*(b*d^2*e*n + a*d^2*e)*x^2 - 3*(b*e^3*x^6 + 9*b*d*e^2*x^4 - 9*b
*d^2*e*x^2 - b*d^3)*log(c) - 3*(b*e^3*n*x^6 + 9*b*d*e^2*n*x^4 - 9*b*d^2*e*
n*x^2 - b*d^3*n)*log(x))/x^3
```

3.206.6 Sympy [A] (verification not implemented)

Time = 0.71 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.28

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^4} \, dx = -\frac{ad^3}{3x^3} - \frac{3ad^2e}{x} + 3ade^2x + \frac{ae^3x^3}{3} - \frac{bd^3n}{9x^3} - \frac{bd^3\log(cx^n)}{3x^3} - \frac{3bd^2en}{x} - \frac{3bd^2e\log(cx^n)}{x} - 3bde^2nx + 3bde^2x\log(cx^n) - \frac{be^3nx^3}{9} + \frac{be^3x^3\log(cx^n)}{3}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d**3/(3*x**3) - 3*a*d**2*e/x + 3*a*d*e**2*x + a*e**3*x**3/3 - b*d**3*n/
(9*x**3) - b*d**3*log(c*x**n)/(3*x**3) - 3*b*d**2*e*n/x - 3*b*d**2*e*log(c
*x**n)/x - 3*b*d*e**2*n*x + 3*b*d*e**2*x*log(c*x**n) - b*e**3*n*x**3/9 + b
*e**3*x**3*log(c*x**n)/3
```

3.206.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^4} \, dx = -\frac{1}{9}be^3nx^3 + \frac{1}{3}be^3x^3\log(cx^n) + \frac{1}{3}ae^3x^3 - 3bde^2nx + 3bde^2x\log(cx^n) + 3ade^2x - \frac{3bd^2en}{x} - \frac{3bd^2e\log(cx^n)}{x} - \frac{3ad^2e}{x} - \frac{bd^3n}{9x^3} - \frac{bd^3\log(cx^n)}{3x^3} - \frac{ad^3}{3x^3}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
-1/9*b*e^3*n*x^3 + 1/3*b*e^3*x^3*log(c*x^n) + 1/3*a*e^3*x^3 - 3*b*d*e^2*n*
x + 3*b*d*e^2*x*log(c*x^n) + 3*a*d*e^2*x - 3*b*d^2*e*n/x - 3*b*d^2*e*log(c
*x^n)/x - 3*a*d^2*e/x - 1/9*b*d^3*n/x^3 - 1/3*b*d^3*log(c*x^n)/x^3 - 1/3*a
*d^3/x^3
```

3.206.8 Giac [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 159, normalized size of antiderivative = 1.31

$$\begin{aligned}\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^4}\,dx &= -\frac{1}{9}\left(be^3n-3\,be^3\log(c)-3\,ae^3\right)x^3-3\left(bde^2n-bde^2\log(c)-ade^2\right)x\\&\quad+\frac{1}{3}\left(be^3nx^3+9\,bde^2nx-\frac{9\,bd^2enx^2+bd^3n}{x^3}\right)\log(x)\\&\quad-\frac{27\,bd^2enx^2+27\,bd^2ex^2\log(c)+27\,ad^2ex^2+bd^3n+3\,bd^3\log(c)+3\,ad^3}{9\,x^3}\end{aligned}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
-1/9*(b*e^3*n - 3*b*e^3*log(c) - 3*a*e^3)*x^3 - 3*(b*d*e^2*n - b*d*e^2*log
(c) - a*d*e^2)*x + 1/3*(b*e^3*n*x^3 + 9*b*d*e^2*n*x - (9*b*d^2*e*n*x^2 + b
*d^3*n)/x^3)*log(x) - 1/9*(27*b*d^2*e*n*x^2 + 27*b*d^2*e*x^2*log(c) + 27*a
*d^2*e*x^2 + b*d^3*n + 3*b*d^3*log(c) + 3*a*d^3)/x^3
```

3.206.9 Mupad [B] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.17

$$\begin{aligned}\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^4}\,dx &= \ln(c\,x^n)\left(\frac{\frac{8\,b\,e^3\,x^6}{3}+8\,b\,d\,e^2\,x^4}{x^3}-\frac{\frac{b\,d^3}{3}+3\,b\,d^2\,e\,x^2+5\,b\,d\,e^2\,x^4+\frac{7\,b\,e^3\,x^6}{3}}{x^3}\right)\\&\quad-\frac{a\,d^3+x^2\,(9\,a\,d^2\,e+9\,b\,d^2\,e\,n)+\frac{b\,d^3\,n}{3}}{3\,x^3}\\&\quad+\frac{e^3\,x^3\,(3\,a-b\,n)}{9}+3\,d\,e^2\,x\,(a-b\,n)\end{aligned}$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^4,x)
```

output
```
log(c*x^n)*(((8*b*e^3*x^6)/3 + 8*b*d*e^2*x^4)/x^3 - ((b*d^3)/3 + (7*b*e^3*
x^6)/3 + 3*b*d^2*e*x^2 + 5*b*d*e^2*x^4)/x^3) - (a*d^3 + x^2*(9*a*d^2*e + 9
*b*d^2*e*n) + (b*d^3*n)/3)/(3*x^3) + (e^3*x^3*(3*a - b*n))/9 + 3*d*e^2*x*(
a - b*n)
```

3.206. $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^4}\,dx$

3.207 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^6}\,dx$

3.207.1 Optimal result

Integrand size = 23, antiderivative size = 118

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^6}\,dx = -\frac{bd^3n}{25x^5}-\frac{bd^2en}{3x^3}-\frac{3bde^2n}{x}-be^3nx-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{d^2e(a+b\log(cx^n))}{x^3}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3x(a+b\log(cx^n))$$

output
```
-1/25*b*d^3*n/x^5-1/3*b*d^2*e*n/x^3-3*b*d*e^2*n/x-b*e^3*n*x-1/5*d^3*(a+b*l
n(c*x^n))/x^5-d^2*e*(a+b*ln(c*x^n))/x^3-3*d*e^2*(a+b*ln(c*x^n))/x+e^3*x*(a
+b*ln(c*x^n))
```

3.207.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 115, normalized size of antiderivative = 0.97

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^6}\,dx = -\frac{15a(d^3+5d^2ex^2+15de^2x^4-5e^3x^6)+bn(3d^3+25d^2ex^2+225de^2x^4+75e^3x^6)+15b(d^3+5d^2ex^2+1}{75x^5}$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/75*(15*a*(d^3 + 5*d^2*e*x^2 + 15*d*e^2*x^4 - 5*e^3*x^6) + b*n*(3*d^3 +
25*d^2*e*x^2 + 225*d*e^2*x^4 + 75*e^3*x^6) + 15*b*(d^3 + 5*d^2*e*x^2 + 15*
d*e^2*x^4 - 5*e^3*x^6)*Log[c*x^n])/x^5
```

3.207.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 114, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^6} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(-\frac{d^3}{5x^6}-\frac{ed^2}{x^4}-\frac{3e^2d}{x^2}+e^3\right)dx-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{d^2e(a+b\log(cx^n))}{x^3}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3x(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{d^2e(a+b\log(cx^n))}{x^3}-\frac{3de^2(a+b\log(cx^n))}{x}+e^3x(a+b\log(cx^n))-bn\left(\frac{d^3}{25x^5}+\frac{d^2e}{3x^3}+\frac{3de^2}{x}+e^3x\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-(b*n*(d^3/(25*x^5) + (d^2*e)/(3*x^3) + (3*d*e^2)/x + e^3*x)) - (d^3*(a +
b*Log[c*x^n]))/(5*x^5) - (d^2*e*(a + b*Log[c*x^n]))/x^3 - (3*d*e^2*(a + b*
Log[c*x^n]))/x + e^3*x*(a + b*Log[c*x^n])
```

3.207.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.207.4 Maple [A] (verified)

Time = 0.67 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.19

method	result
parallelrisch	$-\frac{-75x^6 b\ln(c\,x^n)e^3+75b\,e^3 n\,x^6-75x^6 a\,e^3+225x^4 b\ln(c\,x^n)d\,e^2+225bd\,e^2 n\,x^4+225x^4 ad\,e^2+75b\ln(c\,x^n)d^2 e\,x^2+25b\,d^2 en\,x^2}{75x^5}$
risch	$-\frac{b\left(-5e^3x^6+15e^2d\,x^4+5d^2e\,x^2+d^3\right)\ln(x^n)}{5x^5}-\frac{-150x^6 a\,e^3+450\ln(c)bd\,e^2x^4-225i\pi bd\,e^2x^4\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)-}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/75/x^5*(-75*x^6*b*ln(c*x^n)*e^3+75*b*e^3*n*x^6-75*x^6*a*e^3+225*x^4*b*l
n(c*x^n)*d*e^2+225*b*d*e^2*n*x^4+225*x^4*a*d*e^2+75*b*ln(c*x^n)*d^2*e*x^2+
25*b*d^2*e*n*x^2+75*a*d^2*e*x^2+15*b*ln(c*x^n)*d^3+3*b*d^3*n+15*a*d^3)
```

3.207.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 160, normalized size of antiderivative = 1.36

$$\int \frac{\left(d+ex^2\right)^3\left(a+b\log\left(cx^n\right)\right)}{x^6}\,dx = -\frac{75\left(be^3n-ae^3\right)x^6+3\,bd^3n+225\left(bde^2n+ade^2\right)x^4+15\,ad^3+25\left(bd^2en+3\,ad^2e\right)x^2-15\left(5\,be^3x^6-15\right.}{75\,x^5}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/75*(75*(b*e^3*n - a*e^3)*x^6 + 3*b*d^3*n + 225*(b*d*e^2*n + a*d*e^2)*x^
4 + 15*a*d^3 + 25*(b*d^2*e*n + 3*a*d^2*e)*x^2 - 15*(5*b*e^3*x^6 - 15*b*d*e
^2*x^4 - 5*b*d^2*e*x^2 - b*d^3)*log(c) - 15*(5*b*e^3*n*x^6 - 15*b*d*e^2*n*
x^4 - 5*b*d^2*e*n*x^2 - b*d^3*n)*log(x))/x^5
```

3.207.6 Sympy [A] (verification not implemented)

Time = 0.69 (sec) , antiderivative size = 146, normalized size of antiderivative = 1.24

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^6}\,dx = -\frac{ad^3}{5x^5} - \frac{ad^2e}{x^3} - \frac{3ade^2}{x} + ae^3x - \frac{bd^3n}{25x^5} - \frac{bd^3\log(cx^n)}{5x^5} - \frac{bd^2en}{3x^3} - \frac{bd^2e\log(cx^n)}{x^3} - \frac{3bde^2n}{x} - \frac{3bde^2\log(cx^n)}{x} - be^3nx + be^3x\log(cx^n)$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**6,x)
```

output
```
-a*d**3/(5*x**5) - a*d**2*e/x**3 - 3*a*d*e**2/x + a*e**3*x - b*d**3*n/(25*
x**5) - b*d**3*log(c*x**n)/(5*x**5) - b*d**2*e*n/(3*x**3) - b*d**2*e*log(c
*x**n)/x**3 - 3*b*d*e**2*n/x - 3*b*d*e**2*log(c*x**n)/x - b*e**3*n*x + b*e
**3*x*log(c*x**n)
```

3.207.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.14

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^6}\,dx = -be^3nx + be^3x\log(cx^n) + ae^3x - \frac{3\,bde^2n}{x} - \frac{3\,bde^2\log(cx^n)}{x} - \frac{3\,ade^2}{x} - \frac{bd^2en}{3\,x^3} - \frac{bd^2e\log(cx^n)}{x^3} - \frac{ad^2e}{x^3} - \frac{bd^3n}{25\,x^5} - \frac{bd^3\log(cx^n)}{5\,x^5} - \frac{ad^3}{5\,x^5}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
-b*e^3*n*x + b*e^3*x*log(c*x^n) + a*e^3*x - 3*b*d*e^2*n/x - 3*b*d*e^2*log(
c*x^n)/x - 3*a*d*e^2/x - 1/3*b*d^2*e*n/x^3 - b*d^2*e*log(c*x^n)/x^3 - a*d^
2*e/x^3 - 1/25*b*d^3*n/x^5 - 1/5*b*d^3*log(c*x^n)/x^5 - 1/5*a*d^3/x^5
```

3.207.8 Giac [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 165, normalized size of antiderivative = 1.40

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^6}\,dx$$
$$= -\left(be^3n - be^3\log(c) - ae^3\right)x + \frac{1}{5}\left(5\,be^3nx - \frac{15\,bde^2nx^4 + 5\,bd^2enx^2 + bd^3n}{x^5}\right)\log(x)$$
$$- \frac{225\,bde^2nx^4 + 225\,bde^2x^4\log(c) + 225\,ade^2x^4 + 25\,bd^2enx^2 + 75\,bd^2ex^2\log(c) + 75\,ad^2ex^2 + 3\,bd^3n +}{75\,x^5}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
-(b*e^3*n - b*e^3*log(c) - a*e^3)*x + 1/5*(5*b*e^3*n*x - (15*b*d*e^2*n*x^4
 + 5*b*d^2*e*n*x^2 + b*d^3*n)/x^5)*log(x) - 1/75*(225*b*d*e^2*n*x^4 + 225*
b*d*e^2*x^4*log(c) + 225*a*d*e^2*x^4 + 25*b*d^2*e*n*x^2 + 75*b*d^2*e*x^2*l
og(c) + 75*a*d^2*e*x^2 + 3*b*d^3*n + 15*b*d^3*log(c) + 15*a*d^3)/x^5
```

3.207.9 Mupad [B] (verification not implemented)

Time = 0.43 (sec) , antiderivative size = 125, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^6}\,dx$$
$$= e^3\,x\,(a-b\,n) - \frac{a\,d^3 + x^2\left(5\,a\,d^2\,e + \frac{5\,b\,d^2\,e\,n}{3}\right) + x^4\left(15\,a\,d\,e^2 + 15\,b\,d\,e^2\,n\right) + \frac{b\,d^3\,n}{5}}{5\,x^5}$$
$$- \ln(c\,x^n)\left(\frac{\frac{b\,d^3}{5} + b\,d^2\,e\,x^2 + 3\,b\,d\,e^2\,x^4 + \frac{11\,b\,e^3\,x^6}{5}}{x^5} - \frac{16\,b\,e^3\,x}{5}\right)$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^6,x)
```

output
```
e^3*x*(a - b*n) - (a*d^3 + x^2*(5*a*d^2*e + (5*b*d^2*e*n)/3) + x^4*(15*a*d
*e^2 + 15*b*d*e^2*n) + (b*d^3*n)/5)/(5*x^5) - log(c*x^n)*(((b*d^3)/5 + (11
*b*e^3*x^6)/5 + b*d^2*e*x^2 + 3*b*d*e^2*x^4)/x^5 - (16*b*e^3*x)/5)
```

3.208 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^8}\,dx$

3.208.1 Optimal result

Integrand size = 23, antiderivative size = 127

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^3n}{49x^7}-\frac{3bd^2en}{25x^5}-\frac{bde^2n}{3x^3}-\frac{be^3n}{x} -\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5} -\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}$$

output
```
-1/49*b*d^3*n/x^7-3/25*b*d^2*e*n/x^5-1/3*b*d*e^2*n/x^3-b*e^3*n/x-1/7*d^3*(
a+b*ln(c*x^n))/x^7-3/5*d^2*e*(a+b*ln(c*x^n))/x^5-d*e^2*(a+b*ln(c*x^n))/x^3
-e^3*(a+b*ln(c*x^n))/x
```

3.208.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^3n}{49x^7}-\frac{3bd^2en}{25x^5}-\frac{bde^2n}{3x^3}-\frac{be^3n}{x} -\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5} -\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
-1/49*(b*d^3*n)/x^7 - (3*b*d^2*e*n)/(25*x^5) - (b*d*e^2*n)/(3*x^3) - (b*e^
3*n)/x - (d^3*(a + b*Log[c*x^n]))/(7*x^7) - (3*d^2*e*(a + b*Log[c*x^n]))/(
5*x^5) - (d*e^2*(a + b*Log[c*x^n]))/x^3 - (e^3*(a + b*Log[c*x^n]))/x
```

3.208.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 126, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^8} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{35e^3x^6+35de^2x^4+21d^2ex^2+5d^3}{35x^8}dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{35}bn\int \frac{35e^3x^6+35de^2x^4+21d^2ex^2+5d^3}{x^8}dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{35}bn\int \left(\frac{5d^3}{x^8}+\frac{21ed^2}{x^6}+\frac{35e^2d}{x^4}+\frac{35e^3}{x^2}\right)dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2e(a+b\log(cx^n))}{5x^5}-\frac{de^2(a+b\log(cx^n))}{x^3}-\frac{e^3(a+b\log(cx^n))}{x}+\frac{1}{35}bn\left(-\frac{5d^3}{7x^7}-\frac{21d^2e}{5x^5}-\frac{35de^2}{3x^3}-\frac{35e^3}{x}\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*((-5*d^3)/(7*x^7) - (21*d^2*e)/(5*x^5) - (35*d*e^2)/(3*x^3) - (35*e^3
)/x))/35 - (d^3*(a + b*Log[c*x^n]))/(7*x^7) - (3*d^2*e*(a + b*Log[c*x^n]))
/(5*x^5) - (d*e^2*(a + b*Log[c*x^n]))/x^3 - (e^3*(a + b*Log[c*x^n]))/x
```

3.208.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.208.4 Maple [A] (verified)

Time = 0.68 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.10

method	result
parallelrisch	$-\frac{3675x^6 b\ln(c\,x^n)e^3+3675b\,e^3 n\,x^6+3675x^6 a\,e^3+3675x^4 b\ln(c\,x^n)d\,e^2+1225bd\,e^2 n\,x^4+3675x^4 ad\,e^2+2205b\ln(c\,x^n)d^2 e\,x^2+4}{3675x^7}$
risch	$-\frac{b(35e^3x^6+35e^2d\,x^4+21d^2e\,x^2+5d^3)\ln(x^n)}{35x^7}-\frac{7350x^6 a\,e^3+7350\ln(c)bd\,e^2x^4-3675i\pi bd\,e^2x^4\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

output
```
-1/3675/x^7*(3675*x^6*b*ln(c*x^n)*e^3+3675*b*e^3*n*x^6+3675*x^6*a*e^3+3675
*x^4*b*ln(c*x^n)*d*e^2+1225*b*d*e^2*n*x^4+3675*x^4*a*d*e^2+2205*b*ln(c*x^n
)*d^2*e*x^2+441*b*d^2*e*n*x^2+2205*a*d^2*e*x^2+525*b*ln(c*x^n)*d^3+75*b*d^
3*n+525*a*d^3)
```

3.208.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 160, normalized size of antiderivative = 1.26

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{3675\,(be^3n+ae^3)x^6+75\,bd^3n+1225\,(bde^2n+3\,ade^2)x^4+525\,ad^3+441\,(bd^2en+5\,ad^2e)x^2+105\,(35}{3}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

output
```
-1/3675*(3675*(b*e^3*n + a*e^3)*x^6 + 75*b*d^3*n + 1225*(b*d*e^2*n + 3*a*d
*e^2)*x^4 + 525*a*d^3 + 441*(b*d^2*e*n + 5*a*d^2*e)*x^2 + 105*(35*b*e^3*x^
6 + 35*b*d*e^2*x^4 + 21*b*d^2*e*x^2 + 5*b*d^3)*log(c) + 105*(35*b*e^3*n*x^
6 + 35*b*d*e^2*n*x^4 + 21*b*d^2*e*n*x^2 + 5*b*d^3*n)*log(x))/x^7
```

3.208.6 Sympy [A] (verification not implemented)

Time = 0.96 (sec) , antiderivative size = 158, normalized size of antiderivative = 1.24

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{ad^3}{7x^7} - \frac{3ad^2e}{5x^5} - \frac{ade^2}{x^3} - \frac{ae^3}{x} - \frac{bd^3n}{49x^7} - \frac{bd^3\log(cx^n)}{7x^7} - \frac{3bd^2en}{25x^5} - \frac{3bd^2e\log(cx^n)}{5x^5} - \frac{bde^2n}{3x^3} - \frac{bde^2\log(cx^n)}{x^3} - \frac{be^3n}{x} - \frac{be^3\log(cx^n)}{x}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**8,x)
```

output
```
-a*d**3/(7*x**7) - 3*a*d**2*e/(5*x**5) - a*d*e**2/x**3 - a*e**3/x - b*d**3
*n/(49*x**7) - b*d**3*log(c*x**n)/(7*x**7) - 3*b*d**2*e*n/(25*x**5) - 3*b*
d**2*e*log(c*x**n)/(5*x**5) - b*d*e**2*n/(3*x**3) - b*d*e**2*log(c*x**n)/x
**3 - b*e**3*n/x - b*e**3*log(c*x**n)/x
```

3.208.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{be^3n}{x} - \frac{be^3\log(cx^n)}{x} - \frac{ae^3}{x} - \frac{bde^2n}{3\,x^3} - \frac{bde^2\log(cx^n)}{x^3} - \frac{ade^2}{x^3} - \frac{3\,bd^2en}{25\,x^5} - \frac{3\,bd^2e\log(cx^n)}{5\,x^5} - \frac{3\,ad^2e}{5\,x^5} - \frac{bd^3n}{49\,x^7} - \frac{bd^3\log(cx^n)}{7\,x^7} - \frac{ad^3}{7\,x^7}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

output
```
-b*e^3*n/x - b*e^3*log(c*x^n)/x - a*e^3/x - 1/3*b*d*e^2*n/x^3 - b*d*e^2*lo
g(c*x^n)/x^3 - a*d*e^2/x^3 - 3/25*b*d^2*e*n/x^5 - 3/5*b*d^2*e*log(c*x^n)/x
^5 - 3/5*a*d^2*e/x^5 - 1/49*b*d^3*n/x^7 - 1/7*b*d^3*log(c*x^n)/x^7 - 1/7*a
*d^3/x^7
```

3.208.8 Giac [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 171, normalized size of antiderivative = 1.35

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{(35\,be^3nx^6 + 35\,bde^2nx^4 + 21\,bd^2enx^2 + 5\,bd^3n)\log(x)}{35\,x^7} - \frac{3675\,be^3nx^6 + 3675\,be^3x^6\log(c) + 3675\,ae^3x^6 + 1225\,bde^2nx^4 + 3675\,bde^2x^4\log(c) + 3675\,ade^2x^4 + 44}{3675\,x^7}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

output
```
-1/35*(35*b*e^3*n*x^6 + 35*b*d*e^2*n*x^4 + 21*b*d^2*e*n*x^2 + 5*b*d^3*n)*l
og(x)/x^7 - 1/3675*(3675*b*e^3*n*x^6 + 3675*b*e^3*x^6*log(c) + 3675*a*e^3*
x^6 + 1225*b*d*e^2*n*x^4 + 3675*b*d*e^2*x^4*log(c) + 3675*a*d*e^2*x^4 + 44
1*b*d^2*e*n*x^2 + 2205*b*d^2*e*x^2*log(c) + 2205*a*d^2*e*x^2 + 75*b*d^3*n
+ 525*b*d^3*log(c) + 525*a*d^3)/x^7
```

3.208.9 Mupad [B] (verification not implemented)

Time = 0.43 (sec) , antiderivative size = 123, normalized size of antiderivative = 0.97

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^8}\,dx = -\frac{x^6 (35\,a\,e^3+35\,b\,e^3\,n)+5\,a\,d^3+x^2 \left(21\,a\,d^2\,e+\frac{21\,b\,d^2\,e\,n}{5}\right)+x^4 \left(35\,a\,d\,e^2+\frac{35\,b\,d\,e^2\,n}{3}\right)+\frac{5\,b\,d^3\,n}{7}}{35\,x^7} - \frac{\ln(c\,x^n)\,\left(\frac{b\,d^3}{7}+\frac{3\,b\,d^2\,e\,x^2}{5}+b\,d\,e^2\,x^4+b\,e^3\,x^6\right)}{x^7}$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^8,x)
```

output
```
- (x^6*(35*a*e^3 + 35*b*e^3*n) + 5*a*d^3 + x^2*(21*a*d^2*e + (21*b*d^2*e*n
)/5) + x^4*(35*a*d*e^2 + (35*b*d*e^2*n)/3) + (5*b*d^3*n)/7)/(35*x^7) - (lo
g(c*x^n)*((b*d^3)/7 + b*e^3*x^6 + (3*b*d^2*e*x^2)/5 + b*d*e^2*x^4))/x^7
```

3.209 $\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^{10}}\,dx$

3.209.1 Optimal result

Integrand size = 23, antiderivative size = 133

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^{10}}\,dx = -\frac{bd^3n}{81x^9}-\frac{3bd^2en}{49x^7}-\frac{3bde^2n}{25x^5}-\frac{be^3n}{9x^3}-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2e(a+b\log(cx^n))}{7x^7}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

output
```
-1/81*b*d^3*n/x^9-3/49*b*d^2*e*n/x^7-3/25*b*d*e^2*n/x^5-1/9*b*e^3*n/x^3-1/
9*d^3*(a+b*ln(c*x^n))/x^9-3/7*d^2*e*(a+b*ln(c*x^n))/x^7-3/5*d*e^2*(a+b*ln(
c*x^n))/x^5-1/3*e^3*(a+b*ln(c*x^n))/x^3
```

3.209.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^2)^3(a+b\log(cx^n))}{x^{10}}\,dx = -\frac{bd^3n}{81x^9}-\frac{3bd^2en}{49x^7}-\frac{3bde^2n}{25x^5}-\frac{be^3n}{9x^3}-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2e(a+b\log(cx^n))}{7x^7}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

input
```
Integrate[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^10,x]
```

output
```
-1/81*(b*d^3*n)/x^9 - (3*b*d^2*e*n)/(49*x^7) - (3*b*d*e^2*n)/(25*x^5) - (b
*e^3*n)/(9*x^3) - (d^3*(a + b*Log[c*x^n]))/(9*x^9) - (3*d^2*e*(a + b*Log[c
*x^n]))/(7*x^7) - (3*d*e^2*(a + b*Log[c*x^n]))/(5*x^5) - (e^3*(a + b*Log[c
*x^n]))/(3*x^3)
```

3.209.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 130, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^{10}}\,dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int -\frac{105e^3x^6+189de^2x^4+135d^2ex^2+35d^3}{315x^{10}}dx-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2e(a+b\log(cx^n))}{7x^7}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{315}bn\int \frac{105e^3x^6+189de^2x^4+135d^2ex^2+35d^3}{x^{10}}dx-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2e(a+b\log(cx^n))}{7x^7}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{1}{315}bn\int \left(\frac{35d^3}{x^{10}}+\frac{135ed^2}{x^8}+\frac{189e^2d}{x^6}+\frac{105e^3}{x^4}\right)dx-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2e(a+b\log(cx^n))}{7x^7}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{3x^3}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2e(a+b\log(cx^n))}{7x^7}-\frac{3de^2(a+b\log(cx^n))}{5x^5}-\frac{e^3(a+b\log(cx^n))}{3x^3}+\frac{1}{315}bn\left(-\frac{35d^3}{9x^9}-\frac{135d^2e}{7x^7}-\frac{189de^2}{5x^5}-\frac{35e^3}{x^3}\right)$$

input
```
Int[((d + e*x^2)^3*(a + b*Log[c*x^n]))/x^10,x]
```

output
```
(b*n*((-35*d^3)/(9*x^9) - (135*d^2*e)/(7*x^7) - (189*d*e^2)/(5*x^5) - (35*
e^3)/x^3))/315 - (d^3*(a + b*Log[c*x^n]))/(9*x^9) - (3*d^2*e*(a + b*Log[c*
x^n]))/(7*x^7) - (3*d*e^2*(a + b*Log[c*x^n]))/(5*x^5) - (e^3*(a + b*Log[c*
x^n]))/(3*x^3)
```

3.209.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.209.4 Maple [A] (verified)

Time = 0.67 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.05

method	result
parallelrisch	$-\frac{33075x^6b\ln(c\,x^n)e^3+11025b\,e^3n\,x^6+33075x^6a\,e^3+59535x^4b\ln(c\,x^n)d\,e^2+11907bd\,e^2n\,x^4+59535x^4ad\,e^2+42525b\ln(c\,x^n)d}{99225x^9}$
risch	$-\frac{b\left(105e^3x^6+189e^2d\,x^4+135d^2e\,x^2+35d^3\right)\ln(x^n)}{315x^9}-\frac{66150x^6a\,e^3+119070\ln(c)bd\,e^2x^4-59535i\pi bd\,e^2x^4\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)}{}$

input
```
int((e*x^2+d)^3*(a+b*ln(c*x^n))/x^10,x,method=_RETURNVERBOSE)
```

output
```
-1/99225/x^9*(33075*x^6*b*ln(c*x^n)*e^3+11025*b*e^3*n*x^6+33075*x^6*a*e^3+
59535*x^4*b*ln(c*x^n)*d*e^2+11907*b*d*e^2*n*x^4+59535*x^4*a*d*e^2+42525*b*
ln(c*x^n)*d^2*e*x^2+6075*b*d^2*e*n*x^2+42525*a*d^2*e*x^2+11025*b*ln(c*x^n)
*d^3+1225*b*d^3*n+11025*a*d^3)
```

3.209.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 161, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^{10}}\,dx = -\frac{11025\,(be^3n+3\,ae^3)x^6+1225\,bd^3n+11907\,(bde^2n+5\,ade^2)x^4+11025\,ad^3+6075\,(bd^2en+7\,ad^2e)x^2}{}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^10,x, algorithm="fricas")
```

output
```
-1/99225*(11025*(b*e^3*n + 3*a*e^3)*x^6 + 1225*b*d^3*n + 11907*(b*d*e^2*n
+ 5*a*d*e^2)*x^4 + 11025*a*d^3 + 6075*(b*d^2*e*n + 7*a*d^2*e)*x^2 + 315*(1
05*b*e^3*x^6 + 189*b*d*e^2*x^4 + 135*b*d^2*e*x^2 + 35*b*d^3)*log(c) + 315*
(105*b*e^3*n*x^6 + 189*b*d*e^2*n*x^4 + 135*b*d^2*e*n*x^2 + 35*b*d^3*n)*log
(x))/x^9
```

3.209.6 Sympy [A] (verification not implemented)

Time = 1.75 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.33

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^{10}}\,dx = -\frac{ad^3}{9x^9} - \frac{3ad^2e}{7x^7} - \frac{3ade^2}{5x^5} - \frac{ae^3}{3x^3} - \frac{bd^3n}{81x^9} - \frac{bd^3\log(cx^n)}{9x^9} - \frac{3bd^2en}{49x^7} - \frac{3bd^2e\log(cx^n)}{7x^7} - \frac{3bde^2n}{25x^5} - \frac{3bde^2\log(cx^n)}{5x^5} - \frac{be^3n}{9x^3} - \frac{be^3\log(cx^n)}{3x^3}$$

input
```
integrate((e*x**2+d)**3*(a+b*ln(c*x**n))/x**10,x)
```

output
```
-a*d**3/(9*x**9) - 3*a*d**2*e/(7*x**7) - 3*a*d*e**2/(5*x**5) - a*e**3/(3*x
**3) - b*d**3*n/(81*x**9) - b*d**3*log(c*x**n)/(9*x**9) - 3*b*d**2*e*n/(49
*x**7) - 3*b*d**2*e*log(c*x**n)/(7*x**7) - 3*b*d*e**2*n/(25*x**5) - 3*b*d*
e**2*log(c*x**n)/(5*x**5) - b*e**3*n/(9*x**3) - b*e**3*log(c*x**n)/(3*x**3
)
```

3.209.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.08

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^{10}}\,dx = -\frac{be^3n}{9\,x^3} - \frac{be^3\log(cx^n)}{3\,x^3} - \frac{ae^3}{3\,x^3} - \frac{3\,bde^2n}{25\,x^5} - \frac{3\,bde^2\log(cx^n)}{5\,x^5} - \frac{3\,ade^2}{5\,x^5} - \frac{3\,bd^2en}{49\,x^7} - \frac{3\,bd^2e\log(cx^n)}{7\,x^7} - \frac{3\,ad^2e}{7\,x^7} - \frac{bd^3n}{81\,x^9} - \frac{bd^3\log(cx^n)}{9\,x^9} - \frac{ad^3}{9\,x^9}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^10,x, algorithm="maxima")
```

output
```
-1/9*b*e^3*n/x^3 - 1/3*b*e^3*log(c*x^n)/x^3 - 1/3*a*e^3/x^3 - 3/25*b*d*e^2
*n/x^5 - 3/5*b*d*e^2*log(c*x^n)/x^5 - 3/5*a*d*e^2/x^5 - 3/49*b*d^2*e*n/x^7
 - 3/7*b*d^2*e*log(c*x^n)/x^7 - 3/7*a*d^2*e/x^7 - 1/81*b*d^3*n/x^9 - 1/9*b
*d^3*log(c*x^n)/x^9 - 1/9*a*d^3/x^9
```

3.209.8 Giac [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 171, normalized size of antiderivative = 1.29

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^{10}}\,dx = -\frac{(105\,be^3nx^6 + 189\,bde^2nx^4 + 135\,bd^2enx^2 + 35\,bd^3n)\log(x)}{315\,x^9} - \frac{11025\,be^3nx^6 + 33075\,be^3x^6\log(c) + 33075\,ae^3x^6 + 11907\,bde^2nx^4 + 59535\,bde^2x^4\log(c) + 59535\,ade^2}{99225}$$

input
```
integrate((e*x^2+d)^3*(a+b*log(c*x^n))/x^10,x, algorithm="giac")
```

output
```
-1/315*(105*b*e^3*n*x^6 + 189*b*d*e^2*n*x^4 + 135*b*d^2*e*n*x^2 + 35*b*d^3
*n)*log(x)/x^9 - 1/99225*(11025*b*e^3*n*x^6 + 33075*b*e^3*x^6*log(c) + 330
75*a*e^3*x^6 + 11907*b*d*e^2*n*x^4 + 59535*b*d*e^2*x^4*log(c) + 59535*a*d*
e^2*x^4 + 6075*b*d^2*e*n*x^2 + 42525*b*d^2*e*x^2*log(c) + 42525*a*d^2*e*x^
2 + 1225*b*d^3*n + 11025*b*d^3*log(c) + 11025*a*d^3)/x^9
```

3.209.9 Mupad [B] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex^2)^3 (a+b\log(cx^n))}{x^{10}}\,dx = -\frac{x^6 (105\,a\,e^3+35\,b\,e^3\,n)+35\,a\,d^3+x^2\left(135\,a\,d^2\,e+\frac{135\,b\,d^2\,e\,n}{7}\right)+x^4\left(189\,a\,d\,e^2+\frac{189\,b\,d\,e^2\,n}{5}\right)+\frac{35\,b\,d^3\,n}{9}}{315\,x^9} - \frac{\ln(c\,x^n)\left(\frac{b\,d^3}{9}+\frac{3\,b\,d^2\,e\,x^2}{7}+\frac{3\,b\,d\,e^2\,x^4}{5}+\frac{b\,e^3\,x^6}{3}\right)}{x^9}$$

input
```
int(((d + e*x^2)^3*(a + b*log(c*x^n)))/x^10,x)
```

output
```
- (x^6*(105*a*e^3 + 35*b*e^3*n) + 35*a*d^3 + x^2*(135*a*d^2*e + (135*b*d^2
*e*n)/7) + x^4*(189*a*d*e^2 + (189*b*d*e^2*n)/5) + (35*b*d^3*n)/9)/(315*x^
9) - (log(c*x^n)*((b*d^3)/9 + (b*e^3*x^6)/3 + (3*b*d^2*e*x^2)/7 + (3*b*d*e
^2*x^4)/5))/x^9
```

3.210 $\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx$

3.210.1 Optimal result

Integrand size = 23, antiderivative size = 121

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{bdnx^2}{4e^2}-\frac{bnx^4}{16e}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^4(a+b\log(cx^n))}{4e}+\frac{d^2(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^3}+\frac{bd^2n\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^3}$$

output
```
1/4*b*d*n*x^2/e^2-1/16*b*n*x^4/e-1/2*d*x^2*(a+b*ln(c*x^n))/e^2+1/4*x^4*(a+
b*ln(c*x^n))/e+1/2*d^2*(a+b*ln(c*x^n))*ln(1+e*x^2/d)/e^3+1/4*b*d^2*n*polyl
og(2,-e*x^2/d)/e^3
```

3.210.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 174, normalized size of antiderivative = 1.44

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{4bdenx^2-be^2nx^4-8dex^2(a+b\log(cx^n))+4e^2x^4(a+b\log(cx^n))+8d^2(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{16e^3}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
(4*b*d*e*n*x^2 - b*e^2*n*x^4 - 8*d*e*x^2*(a + b*Log[c*x^n]) + 4*e^2*x^4*(a
 + b*Log[c*x^n]) + 8*d^2*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]]
+ 8*d^2*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + 8*b*d^2*n*P
olyLog[2, (Sqrt[e]*x)/Sqrt[-d]] + 8*b*d^2*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^
(3/2)])/(16*e^3)
```

3.210.3 Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 121, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d^2x(a+b\log(cx^n))}{e^2(d+ex^2)}-\frac{dx(a+b\log(cx^n))}{e^2}+\frac{x^3(a+b\log(cx^n))}{e}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e^3}-\frac{dx^2(a+b\log(cx^n))}{2e^2}+\frac{x^4(a+b\log(cx^n))}{4e}+\frac{bd^2n\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^3}+\frac{bdnx^2}{4e^2}-\frac{bnx^4}{16e}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
(b*d*n*x^2)/(4*e^2) - (b*n*x^4)/(16*e) - (d*x^2*(a + b*Log[c*x^n]))/(2*e^2
) + (x^4*(a + b*Log[c*x^n]))/(4*e) + (d^2*(a + b*Log[c*x^n])*Log[1 + (e*x^
2)/d])/(2*e^3) + (b*d^2*n*PolyLog[2, -((e*x^2)/d)])/(4*e^3)
```

3.210.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.210.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.62 (sec) , antiderivative size = 343, normalized size of antiderivative = 2.83

method	result
risch	$\frac{b\ln(x^n)x^4}{4e} - \frac{b\ln(x^n)d\,x^2}{2e^2} + \frac{b\ln(x^n)d^2\ln(e\,x^2+d)}{2e^3} - \frac{bn\,d^2\ln(x)\ln(e\,x^2+d)}{2e^3} + \frac{bn\,d^2\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e^3} + \frac{bn\,d^2\ln(x)\ln\left(\right.}{2e^3}$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
1/4*b*ln(x^n)/e*x^4-1/2*b*ln(x^n)/e^2*d*x^2+1/2*b*ln(x^n)*d^2/e^3*ln(e*x^2
+d)-1/2*b*n*d^2/e^3*ln(x)*ln(e*x^2+d)+1/2*b*n*d^2/e^3*ln(x)*ln((-e*x+(-d*e
)^(1/2))/(-d*e)^(1/2))+1/2*b*n*d^2/e^3*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^
(1/2))+1/2*b*n*d^2/e^3*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n*d^2
/e^3*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/16*b*n*x^4/e+1/4*b*d*n*x^2/e
^2-1/4*b*n*d^2/e^3+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*
b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*
I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/2/e^2*(1/2*e*x^4-d*x^2)+1/2*d^2/e^3*l
n(e*x^2+d))
```

3.210.5 Fricas [F]

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{ex^2+d}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*x^5*log(c*x^n) + a*x^5)/(e*x^2 + d), x)
```

3.210.6 Sympy [A] (verification not implemented)

Time = 35.17 (sec) , antiderivative size = 257, normalized size of antiderivative = 2.12

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{ad^2\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)}{2e^2} - \frac{adx^2}{2e^2} + \frac{ax^4}{4e} - \frac{bd^2n\left(\begin{cases}\frac{x^2}{2d} & \\ \frac{\begin{cases}-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(d)\log(x)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise}\end{cases}}{e} & \end{cases}\right)}{2e^2} + \frac{bd^2\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2e^2} + \frac{bdnx^2}{4e^2} - \frac{bdx^2\log(cx^n)}{2e^2} - \frac{bnx^4}{16e} + \frac{bx^4\log(cx^n)}{4e}$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
a*d**2*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))/(2*e**2) -
 a*d*x**2/(2*e**2) + a*x**4/(4*e) - b*d**2*n*Piecewise((x**2/(2*d), Eq(e,
0)), (Piecewise((-polylog(2, e*x**2*exp_polar(I*pi)/d)/2, (Abs(x) < 1) & (
1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, A
bs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, 1/
Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1
, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x**2*exp_polar(I*pi)/d)/
2, True))/e, True))/(2*e**2) + b*d**2*Piecewise((x**2/d, Eq(e, 0)), (log(d
 + e*x**2)/e, True))*log(c*x**n)/(2*e**2) + b*d*n*x**2/(4*e**2) - b*d*x**2
*log(c*x**n)/(2*e**2) - b*n*x**4/(16*e) + b*x**4*log(c*x**n)/(4*e)
```

3.210.7 Maxima [F]

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{ex^2+d}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
1/4*a*(2*d^2*log(e*x^2 + d)/e^3 + (e*x^4 - 2*d*x^2)/e^2) + b*integrate((x^
5*log(c) + x^5*log(x^n))/(e*x^2 + d), x)
```

3.210.8 Giac [F]

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{ex^2+d}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/(e*x^2 + d), x)
```

3.210.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{x^5\,(a+b\,\ln(c\,x^n))}{e\,x^2+d}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

3.211 $\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx$

3.211.1 Optimal result

Integrand size = 23, antiderivative size = 83

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx = -\frac{bnx^2}{4e}+\frac{x^2(a+b\log(cx^n))}{2e} - \frac{d(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^2} - \frac{bdn\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^2}$$

output
```
-1/4*b*n*x^2/e+1/2*x^2*(a+b*ln(c*x^n))/e-1/2*d*(a+b*ln(c*x^n))*ln(1+e*x^2/
d)/e^2-1/4*b*d*n*polylog(2,-e*x^2/d)/e^2
```

3.211.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.63

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx = -\frac{benx^2-2ex^2(a+b\log(cx^n))+2d(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)+2d(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{4e^2}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
-1/4*(b*e*n*x^2 - 2*e*x^2*(a + b*Log[c*x^n]) + 2*d*(a + b*Log[c*x^n])*Log[
1 + (Sqrt[e]*x)/Sqrt[-d]] + 2*d*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(
-d)^(3/2)] + 2*b*d*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]] + 2*b*d*n*PolyLog[2,
 (d*Sqrt[e]*x)/(-d)^(3/2)])/e^2
```

3.211.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 83, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{x(a+b\log(cx^n))}{e}-\frac{dx(a+b\log(cx^n))}{e(d+ex^2)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e^2}+\frac{x^2(a+b\log(cx^n))}{2e}-\frac{bdn\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^2}-\frac{bnx^2}{4e}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
-1/4*(b*n*x^2)/e + (x^2*(a + b*Log[c*x^n]))/(2*e) - (d*(a + b*Log[c*x^n])*
Log[1 + (e*x^2)/d])/(2*e^2) - (b*d*n*PolyLog[2, -((e*x^2)/d)])/(4*e^2)
```

3.211.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.211.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.44 (sec) , antiderivative size = 284, normalized size of antiderivative = 3.42

method	result
risch	$\frac{b\ln(x^n)x^2}{2e} - \frac{b\ln(x^n)d\ln(e\,x^2+d)}{2e^2} - \frac{bn\,x^2}{4e} + \frac{bnd\ln(x)\ln(e\,x^2+d)}{2e^2} - \frac{bnd\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e^2} - \frac{bnd\ln(x)\ln\left(\frac{ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e^2}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e*x^2-1/2*b*ln(x^n)*d/e^2*ln(e*x^2+d)-1/4*b*n*x^2/e+1/2*b*n*
d/e^2*ln(x)*ln(e*x^2+d)-1/2*b*n*d/e^2*ln(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^
(1/2))-1/2*b*n*d/e^2*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n*d/e
^2*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n*d/e^2*dilog((e*x+(-d*e)
^(1/2))/(-d*e)^(1/2))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2
*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1
/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/2*x^2/e-1/2*d/e^2*ln(e*x^2+d))
```

3.211.5 Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{ex^2+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e*x^2 + d), x)
```

3.211.6 Sympy [A] (verification not implemented)

Time = 17.42 (sec) , antiderivative size = 202, normalized size of antiderivative = 2.43

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx = -\frac{ad\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)}{2e}+\frac{ax^2}{2e}$$
$$+\frac{bdn\left(\begin{cases}\frac{x^2}{2d} & \\ \frac{\begin{cases}-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\frac{\mathrm{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise}\end{cases}}{e} & \end{cases}\right)}{2e}$$
$$-\frac{bd\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2e}-\frac{bnx^2}{4e}+\frac{bx^2\log(cx^n)}{2e}$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
-a*d*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))/(2*e) + a*x*
*2/(2*e) + b*d*n*Piecewise((x**2/(2*d), Eq(e, 0)), (Piecewise((-polylog(2,
 e*x**2*exp_polar(I*pi)/d)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(
x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, Abs(x) < 1), (-log(d)*log(1/x
) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, 1/Abs(x) < 1), (-meijerg(((),
(1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*
log(d) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, True))/e, True))/(2*e) -
b*d*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))*log(c*x**n)/(
2*e) - b*n*x**2/(4*e) + b*x**2*log(c*x**n)/(2*e)
```

3.211.7 Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{ex^2+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
1/2*a*(x^2/e - d*log(e*x^2 + d)/e^2) + b*integrate((x^3*log(c) + x^3*log(x
^n))/(e*x^2 + d), x)
```

3.211.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{ex^2+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^2 + d), x)
```

3.211.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^2}\,dx=\int \frac{x^3\,(a+b\,\ln(c\,x^n))}{e\,x^2+d}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

3.212 $\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx$

3.212.1 Optimal result

Integrand size = 21, antiderivative size = 49

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx=\frac{(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e}+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e}$$

output
```
1/2*(a+b*ln(c*x^n))*ln(1+e*x^2/d)/e+1/4*b*n*polylog(2,-e*x^2/d)/e
```

3.212.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.92

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{(a+b\log(cx^n))\left(\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)+\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)\right)+bn\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)+bn\,\mathrm{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{2e}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
((a + b*Log[c*x^n])*(Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + Log[1 + (d*Sqrt[e]*x)
/(-d)^(3/2)]) + b*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]] + b*n*PolyLog[2, (d*S
qrt[e]*x)/(-d)^(3/2)])/(2*e)
```

3.212.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2775, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx$$

$$\Big\downarrow \text{2775}$$

$$\frac{\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e}-\frac{bn\int\frac{\log\left(\frac{ex^2}{d}+1\right)}{x}dx}{2e}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
((a + b*Log[c*x^n])*Log[1 + (e*x^2)/d])/(2*e) + (b*n*PolyLog[2, -((e*x^2)/
d)])/(4*e)
```

3.212.3.1 Defintions of rubi rules used

rule 2775
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Simp[b*f^m*n*(p/(e*r))   Int[Log[1 + e*(x^r/d)]*((a +
b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.212.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.40 (sec) , antiderivative size = 244, normalized size of antiderivative = 4.98

method	result
risch	$\frac{b\ln(x^n)\ln(e\,x^2+d)}{2e} - \frac{bn\ln(x)\ln(e\,x^2+d)}{2e} + \frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e} + \frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e} + \frac{bn\,\mathrm{dilog}\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e} +$

input
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e*ln(e*x^2+d)-1/2*b/e*n*ln(x)*ln(e*x^2+d)+1/2*b/e*n*ln(x)*ln
((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b/e*n*ln(x)*ln((e*x+(-d*e)^(1/2))/(
-d*e)^(1/2))+1/2*b/e*n*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b/e*n*d
ilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^
n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)/e*ln(e*x^2+d)
```

3.212.5 Fricas [F]

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex^2+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x^n) + a*x)/(e*x^2 + d), x)
```

3.212.6 Sympy [A] (verification not implemented)

Time = 3.27 (sec) , antiderivative size = 141, normalized size of antiderivative = 2.88

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{a\log(d+ex^2)}{2e} - \frac{bn\left(\begin{cases} -\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ \log(d)\log(x) - \frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1 \\ -\log(d)\log\left(\frac{1}{x}\right) - \frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(d) + G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(d) - \frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise} \end{cases}\right)}{2e} + \frac{b\log(cx^n)\log(d+ex^2)}{2e}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
a*log(d + e*x**2)/(2*e) - b*n*Piecewise((-polylog(2, e*x**2*exp_polar(I*pi
)/d)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x**2
*exp_polar(I*pi)/d)/2, Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x**2*
exp_polar(I*pi)/d)/2, 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()),
 x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*
x**2*exp_polar(I*pi)/d)/2, True))/(2*e) + b*log(c*x**n)*log(d + e*x**2)/(2
*e)
```

3.212.7 Maxima [F]

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex^2+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
b*integrate((x*log(c) + x*log(x^n))/(e*x^2 + d), x) + 1/2*a*log(e*x^2 + d)
/e
```

3.212.8 Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex^2+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^2 + d), x)
```

3.212.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{e\,x^2+d}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

3.213 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx$

3.213.1 Optimal result

Integrand size = 23, antiderivative size = 49

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx = -\frac{\log\left(1+\frac{d}{ex^2}\right)(a+b\log(cx^n))}{2d}+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d}$$

output
```
-1/2*ln(1+d/e/x^2)*(a+b*ln(c*x^n))/d+1/4*b*n*polylog(2,-d/e/x^2)/d
```

3.213.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 126 vs. 2(49) = 98.

Time = 0.06 (sec) , antiderivative size = 126, normalized size of antiderivative = 2.57

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx = -\frac{-\left((a+b\log(cx^n))\left(a+b\log(cx^n)-bn\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)-bn\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)\right)\right)+b^2n^2\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)+b^2n^2\,\mathrm{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{2bdn}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)),x]
```

output
```
-1/2*(-((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - b*n*Log[1 + (Sqrt[e]*x)/Sqr
t[-d]] - b*n*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])) + b^2*n^2*PolyLog[2, (Sqr
t[e]*x)/Sqrt[-d]] + b^2*n^2*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(b*d*n)
```

3.213.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)}dx$$

$$\Big\downarrow \text{2779}$$

$$\frac{bn\int \frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{2d}-\frac{\log\left(\frac{d}{ex^2}+1\right)\left(a+b\log(cx^n)\right)}{2d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d}-\frac{\log\left(\frac{d}{ex^2}+1\right)\left(a+b\log(cx^n)\right)}{2d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)),x]
```

output
```
-1/2*(Log[1 + d/(e*x^2)]*(a + b*Log[c*x^n]))/d + (b*n*PolyLog[2, -(d/(e*x^
2))])/(4*d)
```

3.213.3.1 Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))    Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.213.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.42 (sec) , antiderivative size = 274, normalized size of antiderivative = 5.59

method	result
risch	$-\frac{b\ln(x^n)\ln(e\,x^2+d)}{2d}+\frac{b\ln(x^n)\ln(x)}{d}-\frac{bn\ln(x)^2}{2d}+\frac{bn\ln(x)\ln(e\,x^2+d)}{2d}-\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2d}-\frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{-d}}{\sqrt{-de}}\right.}{2d}$

input
```
int((a+b*ln(c*x^n))/x/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)/d*ln(e*x^2+d)+b*ln(x^n)/d*ln(x)-1/2*b*n/d*ln(x)^2+1/2*b*n/d
*ln(x)*ln(e*x^2+d)-1/2*b*n/d*ln(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/
2*b*n/d*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/d*dilog((-e*x+(-
d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/d*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))
+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csg
n(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^
n)^3+b*ln(c)+a)*(-1/2/d*ln(e*x^2+d)+1/d*ln(x))
```

3.213.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^3 + d*x), x)
```

3.213.6 Sympy [A] (verification not implemented)

Time = 6.00 (sec) , antiderivative size = 144, normalized size of antiderivative = 2.94

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx = \frac{a\log(x)}{d} - \frac{a\log(d+ex^2)}{2d} + \frac{bn\left(\begin{cases} \frac{\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ \log(e)\log(x)+\frac{\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for } |x|<1 \\ -\log(e)\log\left(\frac{1}{x}\right)+\frac{\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle|\, x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle|\, x\right)\log(e)+\frac{\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{otherwise} \end{cases}\right)}{2d} - \frac{b\log(cx^n)\log\left(\frac{d}{x^2}+e\right)}{2d}$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x**2+d),x)
```

output
```
a*log(x)/d - a*log(d + e*x**2)/(2*d) + b*n*Piecewise((polylog(2, d*exp_pol
ar(I*pi)/(e*x**2))/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) + pol
ylog(2, d*exp_polar(I*pi)/(e*x**2))/2, Abs(x) < 1), (-log(e)*log(1/x) + po
lylog(2, d*exp_polar(I*pi)/(e*x**2))/2, 1/Abs(x) < 1), (-meijerg(((), (1,
1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(
e) + polylog(2, d*exp_polar(I*pi)/(e*x**2))/2, True))/(2*d) - b*log(c*x**n
)*log(d/x**2 + e)/(2*d)
```

3.213.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d),x, algorithm="maxima")
```

output
```
-1/2*a*(log(e*x^2 + d)/d - 2*log(x)/d) + b*integrate((log(c) + log(x^n))/(
e*x^3 + d*x), x)
```

3.213.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{(ex^2+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)*x), x)
```

3.213.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(e\,x^2+d\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)), x)
```

3.214 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}\,dx$

3.214.1 Optimal result

Integrand size = 23, antiderivative size = 83

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}\,dx = -\frac{bn}{4dx^2}-\frac{a+b\log(cx^n)}{2dx^2}+\frac{e\log\left(1+\frac{d}{ex^2}\right)(a+b\log(cx^n))}{2d^2}-\frac{ben\,\mathrm{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^2}$$

output
```
-1/4*b*n/d/x^2+1/2*(-a-b*ln(c*x^n))/d/x^2+1/2*e*ln(1+d/e/x^2)*(a+b*ln(c*x^
n))/d^2-1/4*b*e*n*polylog(2,-d/e/x^2)/d^2
```

3.214.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 157, normalized size of antiderivative = 1.89

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}\,dx = \frac{-\frac{bdn}{x^2}-\frac{2d(a+b\log(cx^n))}{x^2}-\frac{2e(a+b\log(cx^n))^2}{bn}+2e(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)+2e(a+b\log(cx^n))\log\left(1+\right.}{4d^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)),x]
```

output
```
(-((b*d*n)/x^2) - (2*d*(a + b*Log[c*x^n]))/x^2 - (2*e*(a + b*Log[c*x^n])^2
)/(b*n) + 2*e*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + 2*e*(a +
b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + 2*b*e*n*PolyLog[2, (Sqrt
[e]*x)/Sqrt[-d]] + 2*b*e*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(4*d^2)
```

3.214.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 87, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^3}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x(ex^2+d)}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x(ex^2+d)}dx}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{bn\int \frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{2d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(a+b\log(cx^n))}{2d}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(a+b\log(cx^n))}{2d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)),x]
```

output
```
(-1/4*(b*n)/x^2 - (a + b*Log[c*x^n])/(2*x^2))/d - (e*(-1/2*(Log[1 + d/(e*x
^2)]*(a + b*Log[c*x^n]))/d + (b*n*PolyLog[2, -(d/(e*x^2))])/(4*d)))/d
```

3.214.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.214.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.49 (sec) , antiderivative size = 317, normalized size of antiderivative = 3.82

method	result
risch	$\frac{b\ln(x^n)e\ln(e\,x^2+d)}{2d^2}-\frac{b\ln(x^n)}{2d\,x^2}-\frac{b\ln(x^n)e\ln(x)}{d^2}-\frac{bne\ln(x)\ln(e\,x^2+d)}{2d^2}+\frac{bne\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2d^2}+\frac{bne\ln(x)\ln\left(\frac{ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2d^2}$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)*e/d^2*ln(e*x^2+d)-1/2*b*ln(x^n)/d/x^2-b*ln(x^n)*e/d^2*ln(x)-
1/2*b*n*e/d^2*ln(x)*ln(e*x^2+d)+1/2*b*n*e/d^2*ln(x)*ln((-e*x+(-d*e)^(1/2))
/(-d*e)^(1/2))+1/2*b*n*e/d^2*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2
*b*n*e/d^2*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n*e/d^2*dilog((e*
x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n/d/x^2+1/2*b*n*e/d^2*ln(x)^2+(-1/2*I*
b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n
)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln
(c)+a)*(1/2*e/d^2*ln(e*x^2+d)-1/2/d/x^2-e/d^2*ln(x))
```

3.214.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{(ex^2+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^5 + d*x^3), x)
```

3.214.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)}\,dx=\text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d),x)
```

output
```
Timed out
```

3.214.7 Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x^3(d + ex^2)}\,dx = \int \frac{b\log(cx^n) + a}{(ex^2 + d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d),x, algorithm="maxima")
```

output
```
1/2*a*(e*log(e*x^2 + d)/d^2 - 2*e*log(x)/d^2 - 1/(d*x^2)) + b*integrate((l
og(c) + log(x^n))/(e*x^5 + d*x^3), x)
```

3.214.8 Giac [F]

$$\int \frac{a + b\log(cx^n)}{x^3(d + ex^2)}\,dx = \int \frac{b\log(cx^n) + a}{(ex^2 + d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)*x^3), x)
```

3.214.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{x^3(d + ex^2)}\,dx = \int \frac{a + b\,\ln(c\,x^n)}{x^3\,(e\,x^2 + d)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)), x)
```

3.215 $\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx$

3.215.1 Optimal result

Integrand size = 23, antiderivative size = 121

$$\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx = -\frac{bn}{16dx^4}+\frac{ben}{4d^2x^2}-\frac{a+b\log(cx^n)}{4dx^4}+\frac{e(a+b\log(cx^n))}{2d^2x^2} - \frac{e^2\log\left(1+\frac{d}{ex^2}\right)(a+b\log(cx^n))}{2d^3}+\frac{be^2n\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^3}$$

output
```
-1/16*b*n/d/x^4+1/4*b*e*n/d^2/x^2+1/4*(-a-b*ln(c*x^n))/d/x^4+1/2*e*(a+b*ln
(c*x^n))/d^2/x^2-1/2*e^2*ln(1+d/e/x^2)*(a+b*ln(c*x^n))/d^3+1/4*b*e^2*n*pol
ylog(2,-d/e/x^2)/d^3
```

3.215.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 196, normalized size of antiderivative = 1.62

$$\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx = -\frac{\frac{bd^2n}{x^4}-\frac{4bden}{x^2}+\frac{4d^2(a+b\log(cx^n))}{x^4}-\frac{8de(a+b\log(cx^n))}{x^2}-\frac{8e^2(a+b\log(cx^n))^2}{bn}+8e^2(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)+}{16d^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^5*(d + e*x^2)),x]
```

output
```
-1/16*((b*d^2*n)/x^4 - (4*b*d*e*n)/x^2 + (4*d^2*(a + b*Log[c*x^n]))/x^4 -
(8*d*e*(a + b*Log[c*x^n]))/x^2 - (8*e^2*(a + b*Log[c*x^n])^2)/(b*n) + 8*e^
2*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + 8*e^2*(a + b*Log[c*x^
n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + 8*b*e^2*n*PolyLog[2, (Sqrt[e]*x)/S
qrt[-d]] + 8*b*e^2*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/d^3
```

3.215.3 Rubi [A] (verified)

Time = 0.61 (sec) , antiderivative size = 125, normalized size of antiderivative = 1.03, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2780, 2741, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^5}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^3(ex^2+d)}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{4x^4}-\frac{bn}{16x^4}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x^3(ex^2+d)}dx}{d}$$

$$\Big\downarrow \text{2780}$$

$$\frac{-\frac{a+b\log(cx^n)}{4x^4}-\frac{bn}{16x^4}}{d}-\frac{e\left(\frac{\int \frac{a+b\log(cx^n)}{x^3}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x\left(ex^2+d\right)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{4x^4}-\frac{bn}{16x^4}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{x\left(ex^2+d\right)}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx^n)}{4x^4}-\frac{bn}{16x^4}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{bn\int\frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{2d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(a+b\log(cx^n))}{2d}\right)}{d}\right)}{d}$$

$\downarrow$ 2838

$$\frac{-\frac{a+b\log(cx^n)}{4x^4}-\frac{bn}{16x^4}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{d}-\frac{e\left(\frac{bn\operatorname{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(a+b\log(cx^n))}{2d}\right)}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^5*(d + e*x^2)),x]
```

output
```
(-1/16*(b*n)/x^4 - (a + b*Log[c*x^n])/(4*x^4))/d - (e*((-1/4*(b*n)/x^2 - (
a + b*Log[c*x^n])/(2*x^2))/d - (e*(-1/2*(Log[1 + d/(e*x^2)]*(a + b*Log[c*x
^n]))/d + (b*n*PolyLog[2, -(d/(e*x^2))])/(4*d)))/d))/d
```

3.215.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.215.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.64 (sec) , antiderivative size = 369, normalized size of antiderivative = 3.05

method	result
risch	$-\frac{b\ln(x^n)e^2\ln(e\,x^2+d)}{2d^3}-\frac{b\ln(x^n)}{4d\,x^4}+\frac{b\ln(x^n)e^2\ln(x)}{d^3}+\frac{b\ln(x^n)e}{2d^2x^2}+\frac{ben}{4d^2x^2}-\frac{bn}{16d\,x^4}-\frac{bn\,e^2\ln(x)^2}{2d^3}+\frac{bn\,e^2\ln(x)\ln(e\,x^2}{2d^3}$

input
```
int((a+b*ln(c*x^n))/x^5/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)*e^2/d^3*ln(e*x^2+d)-1/4*b*ln(x^n)/d/x^4+b*ln(x^n)*e^2/d^3*l
n(x)+1/2*b*ln(x^n)*e/d^2/x^2+1/4*b*e*n/d^2/x^2-1/16*b*n/d/x^4-1/2*b*n*e^2/
d^3*ln(x)^2+1/2*b*n*e^2/d^3*ln(x)*ln(e*x^2+d)-1/2*b*n*e^2/d^3*ln(x)*ln((-e
*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n*e^2/d^3*ln(x)*ln((e*x+(-d*e)^(1/2))
/(-d*e)^(1/2))-1/2*b*n*e^2/d^3*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2
*b*n*e^2/d^3*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+(-1/2*I*b*Pi*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi
*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-1/2*e
^2/d^3*ln(e*x^2+d)-1/4/d/x^4+e^2/d^3*ln(x)+1/2*e/d^2/x^2)
```

3.215.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)x^5}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^5/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^7 + d*x^5), x)
```

3.215.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^5\left(d+ex^2\right)}\,dx=\text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**5/(e*x**2+d),x)
```

output
```
Timed out
```

3.215.7 Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^5\left(d+ex^2\right)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{(ex^2+d)x^5}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^5/(e*x^2+d),x, algorithm="maxima")
```

output
```
-1/4*a*(2*e^2*log(e*x^2 + d)/d^3 - 4*e^2*log(x)/d^3 - (2*e*x^2 - d)/(d^2*x
^4)) + b*integrate((log(c) + log(x^n))/(e*x^7 + d*x^5), x)
```

3.215.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^5\left(d+ex^2\right)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{(ex^2+d)x^5}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^5/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)*x^5), x)
```

3.215.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^5(d+ex^2)}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^5\,(e\,x^2+d)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^5*(d + e*x^2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^5*(d + e*x^2)), x)
```

3.216 $\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx$

3.216.1 Optimal result

Integrand size = 23, antiderivative size = 167

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = -\frac{adx}{e^2}+\frac{bdnx}{e^2}-\frac{bnx^3}{9e}-\frac{bdx\log(cx^n)}{e^2}+\frac{x^3(a+b\log(cx^n))}{3e}+\frac{d^{3/2}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{5/2}}-\frac{ibd^{3/2}n\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{ibd^{3/2}n\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2e^{5/2}}$$

output
```
-a*d*x/e^2+b*d*n*x/e^2-1/9*b*n*x^3/e-b*d*x*ln(c*x^n)/e^2+1/3*x^3*(a+b*ln(c
*x^n))/e+d^(3/2)*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/e^(5/2)-1/2*I*b
*d^(3/2)*n*polylog(2,-I*x*e^(1/2)/d^(1/2))/e^(5/2)+1/2*I*b*d^(3/2)*n*polyl
og(2,I*x*e^(1/2)/d^(1/2))/e^(5/2)
```

3.216.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 208, normalized size of antiderivative = 1.25

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{-18ad\sqrt{e}x+18bd\sqrt{e}nx-2be^{3/2}nx^3-18bd\sqrt{e}x\log(cx^n)+6e^{3/2}x^3(a+b\log(cx^n))+9\sqrt{-d}d(a+b\log}{}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
(-18*a*d*Sqrt[e]*x + 18*b*d*Sqrt[e]*n*x - 2*b*e^(3/2)*n*x^3 - 18*b*d*Sqrt[
e]*x*Log[c*x^n] + 6*e^(3/2)*x^3*(a + b*Log[c*x^n]) + 9*Sqrt[-d]*d*(a + b*L
og[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + 9*(-d)^(3/2)*(a + b*Log[c*x^n])
*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + 9*b*(-d)^(3/2)*n*PolyLog[2, (Sqrt[e]*
x)/Sqrt[-d]] - 9*b*(-d)^(3/2)*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(18*
e^(5/2))
```

3.216.3 Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))}{e^2(d+ex^2)}-\frac{d(a+b\log(cx^n))}{e^2}+\frac{x^2(a+b\log(cx^n))}{e}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^{3/2}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{5/2}}+\frac{x^3(a+b\log(cx^n))}{3e}-\frac{adx}{e^2}-\frac{bdx\log(cx^n)}{e^2}-\frac{ibd^{3/2}n\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{ibd^{3/2}n\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{bdnx}{e^2}-\frac{bnx^3}{9e}$$

input
```
Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
-((a*d*x)/e^2) + (b*d*n*x)/e^2 - (b*n*x^3)/(9*e) - (b*d*x*Log[c*x^n])/e^2
+ (x^3*(a + b*Log[c*x^n]))/(3*e) + (d^(3/2)*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a
 + b*Log[c*x^n]))/e^(5/2) - ((I/2)*b*d^(3/2)*n*PolyLog[2, ((-I)*Sqrt[e]*x)
/Sqrt[d]])/e^(5/2) + ((I/2)*b*d^(3/2)*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])
/e^(5/2)
```

3.216.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.216.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.49 (sec) , antiderivative size = 365, normalized size of antiderivative = 2.19

method	result
risch	$\frac{b\ln(x^n)x^3}{3e} - \frac{b\ln(x^n)dx}{e^2} - \frac{b\,d^2\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{e^2\sqrt{de}} + \frac{b\,d^2\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{e^2\sqrt{de}} - \frac{bn\,x^3}{9e} + \frac{bdnx}{e^2} + \frac{bn\,d^2\ln(x)\ln\left(\frac{-ex+\sqrt{-}}{\sqrt{-de}}\right.}{2e^2\sqrt{-de}}$

input
```
int(x^4*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
1/3*b*ln(x^n)/e*x^3-b*ln(x^n)/e^2*d*x-b*d^2/e^2/(d*e)^(1/2)*arctan(x*e/(d*
e)^(1/2))*n*ln(x)+b*d^2/e^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)-1/
9*b*n*x^3/e+b*d*n*x/e^2+1/2*b*n*d^2/e^2*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)
^(1/2))/(-d*e)^(1/2))-1/2*b*n*d^2/e^2*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1
/2))/(-d*e)^(1/2))+1/2*b*n*d^2/e^2/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2))/
(-d*e)^(1/2))-1/2*b*n*d^2/e^2/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)
^(1/2))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I
*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn
(I*c*x^n)^3+b*ln(c)+a)*(1/e^2*(1/3*e*x^3-d*x)+d^2/e^2/(d*e)^(1/2)*arctan(x
*e/(d*e)^(1/2)))
```

3.216.5 Fricas [F]

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{ex^2+d}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*x^4*log(c*x^n) + a*x^4)/(e*x^2 + d), x)
```

3.216.6 Sympy [F]

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx$$

input
```
integrate(x**4*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
Integral(x**4*(a + b*log(c*x**n))/(d + e*x**2), x)
```

3.216.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.216.8 Giac [F]

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{ex^2+d}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^4/(e*x^2 + d), x)
```

3.216.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^4(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{x^4\,(a+b\,\ln(c\,x^n))}{e\,x^2+d}\,dx$$

input
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

output
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

3.217 $\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx$

3.217.1 Optimal result

Integrand size = 23, antiderivative size = 132

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{ax}{e}-\frac{bnx}{e}+\frac{bx\log(cx^n)}{e}-\frac{\sqrt{d}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}} + \frac{ib\sqrt{d}n\,\mathrm{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2e^{3/2}}-\frac{ib\sqrt{d}n\,\mathrm{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2e^{3/2}}$$

output
```
a*x/e-b*n*x/e+b*x*ln(c*x^n)/e-arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*d^
(1/2)/e^(3/2)+1/2*I*b*n*polylog(2,-I*x*e^(1/2)/d^(1/2))*d^(1/2)/e^(3/2)-1/
2*I*b*n*polylog(2,I*x*e^(1/2)/d^(1/2))*d^(1/2)/e^(3/2)
```

3.217.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 170, normalized size of antiderivative = 1.29

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{2a\sqrt{e}x-2b\sqrt{e}nx+2b\sqrt{e}x\log(cx^n)-\sqrt{-d}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)+\sqrt{-d}(a+b\log(cx^n))\log\left(\right.}{2e^{3/2}}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
(2*a*Sqrt[e]*x - 2*b*Sqrt[e]*n*x + 2*b*Sqrt[e]*x*Log[c*x^n] - Sqrt[-d]*(a
+ b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + Sqrt[-d]*(a + b*Log[c*x^n]
)*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + b*Sqrt[-d]*n*PolyLog[2, (Sqrt[e]*x)/
Sqrt[-d]] - b*Sqrt[-d]*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(2*e^(3/2))
```

3.217.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 132, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{a+b\log(cx^n)}{e}-\frac{d(a+b\log(cx^n))}{e(d+ex^2)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{\sqrt{d}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}}+\frac{ax}{e}+\frac{bx\log(cx^n)}{e}+\frac{ib\sqrt{d}n\operatorname{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2e^{3/2}}-\frac{ib\sqrt{d}n\operatorname{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2e^{3/2}}-\frac{bnx}{e}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
(a*x)/e - (b*n*x)/e + (b*x*Log[c*x^n])/e - (Sqrt[d]*ArcTan[(Sqrt[e]*x)/Sqr
t[d]]*(a + b*Log[c*x^n]))/e^(3/2) + ((I/2)*b*Sqrt[d]*n*PolyLog[2, ((-I)*Sq
rt[e]*x)/Sqrt[d]])/e^(3/2) - ((I/2)*b*Sqrt[d]*n*PolyLog[2, (I*Sqrt[e]*x)/S
qrt[d]])/e^(3/2)
```

3.217.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.217.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.41 (sec) , antiderivative size = 317, normalized size of antiderivative = 2.40

method	result
risch	$\frac{b\ln(x^n)x}{e}+\frac{bd\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{e\sqrt{de}}-\frac{bd\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{e\sqrt{de}}-\frac{bnx}{e}-\frac{bnd\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e\sqrt{-de}}+\frac{bnd\ln(x)\ln\left(\frac{ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e\sqrt{-de}}$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/e*x+b*d/e/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n*ln(x)-b*d/e/(d*e
)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)-b*n*x/e-1/2*b*n*d/e*ln(x)/(-d*e)^(
1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n*d/e*ln(x)/(-d*e)^(1/2)*l
n((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n*d/e/(-d*e)^(1/2)*dilog((-e*x+(-
d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n*d/e/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2)
)/(-d*e)^(1/2))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*P
i*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b
*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(x/e-d/e/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2)
))
```

3.217.5 Fricas [F]

$$\int \frac{x^2(a + b\log(cx^n))}{d + ex^2}\,dx = \int \frac{(b\log(cx^n) + a)x^2}{ex^2 + d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e*x^2 + d), x)
```

3.217.6 Sympy [F]

$$\int \frac{x^2(a + b\log(cx^n))}{d + ex^2}\,dx = \int \frac{x^2(a + b\log(cx^n))}{d + ex^2}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2), x)
```

3.217.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^2(a + b\log(cx^n))}{d + ex^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.217.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{ex^2+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^2 + d), x)
```

3.217.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{e\,x^2+d}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

3.218 $\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx$

3.218.1 Optimal result

Integrand size = 20, antiderivative size = 105

$$\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx = \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}} - \frac{ibn\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2\sqrt{d}\sqrt{e}} + \frac{ibn\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2\sqrt{d}\sqrt{e}}$$

output
```
arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)/e^(1/2)-1/2*I*b*n*polylo
g(2,-I*x*e^(1/2)/d^(1/2))/d^(1/2)/e^(1/2)+1/2*I*b*n*polylog(2,I*x*e^(1/2)/
d^(1/2))/d^(1/2)/e^(1/2)
```

3.218.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 107, normalized size of antiderivative = 1.02

$$\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx = \frac{-\left((a+b\log(cx^n))\left(\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)-\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)\right)\right)+bn\,\text{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)-bn\,\text{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{2\sqrt{-d}\sqrt{e}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^2),x]
```

output
```
(-((a + b*Log[c*x^n])*(Log[1 + (Sqrt[e]*x)/Sqrt[-d]] - Log[1 + (d*Sqrt[e]*
x)/(-d)^(3/2)])) + b*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]] - b*n*PolyLog[2, (
d*Sqrt[e]*x)/(-d)^(3/2)])/(2*Sqrt[-d]*Sqrt[e])
```

3.218.3 Rubi [A] (verified)

Time = 0.30 (sec) , antiderivative size = 96, normalized size of antiderivative = 0.91, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{d+ex^2}dx$$

$$\Big\downarrow \text{2761}$$

$$\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx$$

$$\Big\downarrow \text{27}$$

$$\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}$$

$$\Big\downarrow \text{5355}$$

$$\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\int \frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int \frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}dx\right)}{\sqrt{d}\sqrt{e}}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^2),x]
```

output
```
(ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(Sqrt[d]*Sqrt[e]) - (b*n*
((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] - (I/2)*PolyLog[2, (I*Sqrt[e]*
x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e])
```

3.218.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

3.218.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.40 (sec) , antiderivative size = 263, normalized size of antiderivative = 2.50

method	result
risch	$-\frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{\sqrt{de}}+\frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{\sqrt{de}}+\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2\sqrt{-de}}-\frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2\sqrt{-de}}+\frac{bn\,\mathrm{dilog}\left(\frac{-ex+\sqrt{-d}}{\sqrt{-de}}\right.}{2\sqrt{-de}}$

input
```
int((a+b*ln(c*x^n))/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
-b/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n*ln(x)+b/(d*e)^(1/2)*arctan(x*e/(d
*e)^(1/2))*ln(x^n)+1/2*b*n*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e
)^(1/2))-1/2*b*n*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/
2*b*n/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/(-d*e)^
(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I
*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I
*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)/(d*e)^(1/2)*ar
ctan(x*e/(d*e)^(1/2))
```

3.218.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx = \int \frac{b\log(cx^n)+a}{ex^2+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^2 + d), x)
```

3.218.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx = \int \frac{a+b\log(cx^n)}{d+ex^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**2), x)
```

3.218.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.218.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx=\int \frac{b\log(cx^n)+a}{ex^2+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^2 + d), x)
```

3.218.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{d+ex^2}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{e\,x^2+d}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^2),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^2), x)
```

3.219 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx$

3.219.1 Optimal result

Integrand size = 23, antiderivative size = 134

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx = -\frac{bn}{dx}-\frac{a+b\log(cx^n)}{dx}-\frac{\sqrt{e}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}+\frac{ib\sqrt{e}n\,\mathrm{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}}-\frac{ib\sqrt{e}n\,\mathrm{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}}$$

output
```
-b*n/d/x+(-a-b*ln(c*x^n))/d/x-arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*e^
(1/2)/d^(3/2)+1/2*I*b*n*polylog(2,-I*x*e^(1/2)/d^(1/2))*e^(1/2)/d^(3/2)-1/
2*I*b*n*polylog(2,I*x*e^(1/2)/d^(1/2))*e^(1/2)/d^(3/2)
```

3.219.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 173, normalized size of antiderivative = 1.29

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx = \frac{d\left(-2b(-d)^{3/2}n+2\sqrt{-d}d(a+b\log(cx^n))-d\sqrt{e}x(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)+d\sqrt{e}x(a+b\log(cx^n\right.}{2(-d)^{7/2}x}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)),x]
```

output
```
(d*(-2*b*(-d)^(3/2)*n + 2*Sqrt[-d]*d*(a + b*Log[c*x^n]) - d*Sqrt[e]*x*(a +
 b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + d*Sqrt[e]*x*(a + b*Log[c*x^
n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)] + b*d*Sqrt[e]*n*x*PolyLog[2, (Sqrt[e
]*x)/Sqrt[-d]] - b*d*Sqrt[e]*n*x*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)]))/(2
*(-d)^(7/2)*x)
```

3.219.3 Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 130, normalized size of antiderivative = 0.97, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.261, Rules used = {2780, 2741, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{d}$$

$$\Big\downarrow \text{2761}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx\right)}{d}$$

$$\Big\downarrow \text{27}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}\right)}{d}$$

$$\Big\downarrow \text{5355}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\int\frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int\frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}dx\right)}{\sqrt{d}\sqrt{e}}\right)}{d}$$

$$\Big\downarrow \; 2838$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)),x]
```

output
```
(-((b*n)/x) - (a + b*Log[c*x^n])/x)/d - (e*((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(
a + b*Log[c*x^n]))/(Sqrt[d]*Sqrt[e]) - (b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e
]*x)/Sqrt[d]] - (I/2)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e]
)))/d
```

3.219.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

3.219.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.46 (sec) , antiderivative size = 325, normalized size of antiderivative = 2.43

method	result
risch	$\frac{be\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{d\sqrt{de}}-\frac{be\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{d\sqrt{de}}-\frac{b\ln(x^n)}{dx}-\frac{bne\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2d\sqrt{-de}}+\frac{bne\ln(x)\ln\left(\frac{ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2d\sqrt{-de}}-\frac{bne}{}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
b*e/d/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n*ln(x)-b*e/d/(d*e)^(1/2)*arctan
(x*e/(d*e)^(1/2))*ln(x^n)-b*ln(x^n)/d/x-1/2*b*n*e/d*ln(x)/(-d*e)^(1/2)*ln(
(-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n*e/d*ln(x)/(-d*e)^(1/2)*ln((e*x+(
-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n*e/d/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/
2))/(-d*e)^(1/2))+1/2*b*n*e/d/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)
^(1/2))-b*n/d/x+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*P
i*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b
*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-e/d/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))-1
/d/x)
```

3.219.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^4 + d*x^2), x)
```

3.219.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx=\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*(d + e*x**2)), x)
```

3.219.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.219.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)*x^2), x)
```

3.219.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x^2\,(e\,x^2+d)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)), x)
```

3.220 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx$

3.220.1 Optimal result

Integrand size = 23, antiderivative size = 165

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx = -\frac{bn}{9dx^3}+\frac{ben}{d^2x}-\frac{a+b\log(cx^n)}{3dx^3}+\frac{e(a+b\log(cx^n))}{d^2x} + \frac{e^{3/2}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{5/2}} - \frac{ibe^{3/2}n\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2d^{5/2}}+\frac{ibe^{3/2}n\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{2d^{5/2}}$$

output
```
-1/9*b*n/d/x^3+b*e*n/d^2/x+1/3*(-a-b*ln(c*x^n))/d/x^3+e*(a+b*ln(c*x^n))/d^
2/x+e^(3/2)*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(5/2)-1/2*I*b*e^(3
/2)*n*polylog(2,-I*x*e^(1/2)/d^(1/2))/d^(5/2)+1/2*I*b*e^(3/2)*n*polylog(2,
I*x*e^(1/2)/d^(1/2))/d^(5/2)
```

3.220.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 211, normalized size of antiderivative = 1.28

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx = \frac{1}{18}\left(-\frac{2bn}{dx^3}+\frac{18ben}{d^2x}-\frac{6(a+b\log(cx^n))}{dx^3}+\frac{18e(a+b\log(cx^n))}{d^2x} - \frac{9e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}} + \frac{9e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}} + \frac{9be^{3/2}n\,\text{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}} - \frac{9be^{3/2}n\,\text{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)),x]
```

output
```
((-2*b*n)/(d*x^3) + (18*b*e*n)/(d^2*x) - (6*(a + b*Log[c*x^n]))/(d*x^3) +
(18*e*(a + b*Log[c*x^n]))/(d^2*x) - (9*e^(3/2)*(a + b*Log[c*x^n])*Log[1 +
(Sqrt[e]*x)/Sqrt[-d]])/(-d)^(5/2) + (9*e^(3/2)*(a + b*Log[c*x^n])*Log[1 +
(d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(5/2) + (9*b*e^(3/2)*n*PolyLog[2, (Sqrt[e]
*x)/Sqrt[-d]])/(-d)^(5/2) - (9*b*e^(3/2)*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(
3/2)])/(-d)^(5/2))/18
```

3.220.3 Rubi [A] (verified)

Time = 0.66 (sec) , antiderivative size = 168, normalized size of antiderivative = 1.02, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2780, 2741, 2780, 2741, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx$$

$$\Big\downarrow \; 2780$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^4}dx}{d} - \frac{e\int \frac{a+b\log(cx^n)}{x^2(ex^2+d)}dx}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\int\frac{a+b\log(cx^n)}{x^2(ex^2+d)}dx}{d}$$

$$\Big\downarrow \text{2780}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{\int\frac{a+b\log(cx^n)}{x^2}dx}{d}-\frac{e\int\frac{a+b\log(cx^n)}{ex^2+d}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\int\frac{a+b\log(cx^n)}{ex^2+d}dx}{d}\right)}{d}$$

$$\Big\downarrow \text{2761}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-bn\int\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{27}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\int\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}\right)}{d}\right)}{d}$$

$$\Big\downarrow \text{5355}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\int\frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int\frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}dx\right)}{\sqrt{d}\sqrt{e}}\right)}{d}\right)}{d}$$

3.220. $\int\frac{a+b\log(cx^n)}{x^4(d+ex^2)}dx$

$$\Big\downarrow \text{2838}$$

$$\frac{-\frac{a+b\log(cx^n)}{3x^3}-\frac{bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}\right)}{d}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)),x]
```

output
```
(-1/9*(b*n)/x^3 - (a + b*Log[c*x^n])/(3*x^3))/d - (e*((-((b*n)/x) - (a + b
*Log[c*x^n])/x)/d - (e*((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(
Sqrt[d]*Sqrt[e]) - (b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] - (I/2
)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e])))/d))/d
```

3.220.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

3.220.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.56 (sec) , antiderivative size = 369, normalized size of antiderivative = 2.24

method	result
risch	$-\frac{b\,e^2 \arctan\left(\frac{xe}{\sqrt{de}}\right) n \ln(x)}{d^2\sqrt{de}} + \frac{b\,e^2 \arctan\left(\frac{xe}{\sqrt{de}}\right) \ln(x^n)}{d^2\sqrt{de}} - \frac{b \ln(x^n)}{3d\,x^3} + \frac{b \ln(x^n) e}{d^2 x} + \frac{bn\,e^2 \ln(x) \ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2d^2\sqrt{-de}} - \frac{bn\,e^2 \ln(x) \ln}{2d^2}$

input
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d),x,method=_RETURNVERBOSE)
```

output
```
-b*e^2/d^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n*ln(x)+b*e^2/d^2/(d*e)^(1/
2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)-1/3*b*ln(x^n)/d/x^3+b*ln(x^n)*e/d^2/x+1
/2*b*n*e^2/d^2*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2
*b*n*e^2/d^2*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*
n*e^2/d^2/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n*e^2
/d^2/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/9*b*n/d/x^3+b*e
*n/d^2/x+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(
I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csg
n(I*c*x^n)^3+b*ln(c)+a)*(e^2/d^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))-1/3/d
/x^3+e/d^2/x)
```

3.220.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^6 + d*x^4), x)
```

3.220.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx = \int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**4*(d + e*x**2)), x)
```

3.220.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.220.8 Giac [F]

$$\int \frac{a + b \log(cx^n)}{x^4(d + ex^2)} \, dx = \int \frac{b \log(cx^n) + a}{(ex^2 + d)x^4} \, dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)*x^4), x)
```

3.220.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a + b \log(cx^n)}{x^4(d + ex^2)} \, dx = \int \frac{a + b \ln(c\,x^n)}{x^4\,(e\,x^2 + d)} \, dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)), x)
```

3.221 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

3.221.1 Optimal result

Integrand size = 23, antiderivative size = 129

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = -\frac{bnx^2}{4e^2}+\frac{x^2(a+b\log(cx^n))}{2e^2}+\frac{dx^2(a+b\log(cx^n))}{2e^2(d+ex^2)}-\frac{bdn\log(d+ex^2)}{4e^3}-\frac{d(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{e^3}-\frac{bdn\,\mathrm{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{2e^3}$$

output
```
-1/4*b*n*x^2/e^2+1/2*x^2*(a+b*ln(c*x^n))/e^2+1/2*d*x^2*(a+b*ln(c*x^n))/e^2
/(e*x^2+d)-1/4*b*d*n*ln(e*x^2+d)/e^3-d*(a+b*ln(c*x^n))*ln(1+e*x^2/d)/e^3-1
/2*b*d*n*polylog(2,-e*x^2/d)/e^3
```

3.221.2 Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.35 (sec) , antiderivative size = 287, normalized size of antiderivative = 2.22

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$= \frac{2ex^2(a-bn\log(x)+b\log(cx^n))-\frac{2d^2(a-bn\log(x)+b\log(cx^n))}{d+ex^2}-4d(a-bn\log(x)+b\log(cx^n))\log(d+ex^2)\cdots}{\cdots}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
(2*e*x^2*(a - b*n*Log[x] + b*Log[c*x^n]) - (2*d^2*(a - b*n*Log[x] + b*Log[
c*x^n]))/(d + e*x^2) - 4*d*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d + e*x^2]
+ b*n*((d*Sqrt[e]*x*Log[x])/((-I)*Sqrt[d] + Sqrt[e]*x) + (d*Sqrt[e]*x*Log[
x])/(I*Sqrt[d] + Sqrt[e]*x) + e*x^2*(-1 + 2*Log[x]) - d*Log[I*Sqrt[d] - Sq
rt[e]*x] - d*Log[I*Sqrt[d] + Sqrt[e]*x] - 4*d*(Log[x]*Log[1 + (I*Sqrt[e]*x
)/Sqrt[d]] + PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]) - 4*d*(Log[x]*Log[1 - (
I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])))/(4*e^3)
```

3.221.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 129, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d^2x(a+b\log(cx^n))}{e^2(d+ex^2)^2}-\frac{2dx(a+b\log(cx^n))}{e^2(d+ex^2)}+\frac{x(a+b\log(cx^n))}{e^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{e^3}+\frac{dx^2(a+b\log(cx^n))}{2e^2(d+ex^2)}+\frac{x^2(a+b\log(cx^n))}{2e^2}-\frac{bdn\operatorname{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{2e^3}-\frac{bdn\log(d+ex^2)}{4e^3}-\frac{bnx^2}{4e^2}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
-1/4*(b*n*x^2)/e^2 + (x^2*(a + b*Log[c*x^n]))/(2*e^2) + (d*x^2*(a + b*Log[
c*x^n]))/(2*e^2*(d + e*x^2)) - (b*d*n*Log[d + e*x^2])/(4*e^3) - (d*(a + b*
Log[c*x^n])*Log[1 + (e*x^2)/d])/e^3 - (b*d*n*PolyLog[2, -((e*x^2)/d)])/(2*
e^3)
```

3.221.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.221.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.54 (sec) , antiderivative size = 351, normalized size of antiderivative = 2.72

method	result
risch	$-\frac{b\ln(x^n)d^2}{2e^3(e\,x^2+d)}-\frac{b\ln(x^n)d\ln(e\,x^2+d)}{e^3}+\frac{b\ln(x^n)x^2}{2e^2}-\frac{bn\,x^2}{4e^2}-\frac{bdn\ln(e\,x^2+d)}{4e^3}+\frac{bnd\ln(x)}{2e^3}+\frac{bnd\ln(x)\ln(e\,x^2+d)}{e^3}-$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)*d^2/e^3/(e*x^2+d)-b*ln(x^n)*d/e^3*ln(e*x^2+d)+1/2*b*ln(x^n)
/e^2*x^2-1/4*b*n*x^2/e^2-1/4*b*d*n*ln(e*x^2+d)/e^3+1/2*b*n/e^3*d*ln(x)+b*n
*d/e^3*ln(x)*ln(e*x^2+d)-b*n*d/e^3*ln(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/
2))-b*n*d/e^3*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-b*n*d/e^3*dilog((-
e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-b*n*d/e^3*dilog((e*x+(-d*e)^(1/2))/(-d*e)^
(1/2))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*
c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(
I*c*x^n)^3+b*ln(c)+a)*(-1/2*d/e^2*(d/e/(e*x^2+d)+2/e*ln(e*x^2+d))+1/2*x^2/
e^2)
```

3.221.5 Fricas [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x^5*log(c*x^n) + a*x^5)/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

3.221.6 Sympy [A] (verification not implemented)

Time = 44.05 (sec) , antiderivative size = 316, normalized size of antiderivative = 2.45

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$= \frac{ad^2\left(\begin{cases}\frac{x^2}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x^2} & \text{otherwise}\end{cases}\right)}{2e^2} - \frac{ad\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)}{e^2} + \frac{ax^2}{2e^2}$$
$$- \frac{bd^2n\left(\begin{cases}\frac{x^2}{2d^2} & \text{for } e=0\\ -\frac{\log(x)}{de}+\frac{\log\left(\frac{d}{e}+x^2\right)}{2de} & \text{otherwise}\end{cases}\right)}{2e^2} + \frac{bd^2\left(\begin{cases}\frac{x^2}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2e^2}$$
$$+ \frac{bdn\left(\begin{cases}\frac{x^2}{2d} & \\ \frac{\begin{cases}-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(d)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise}\end{cases}}{e} & \end{cases}\right)}{e^2}$$
$$- \frac{bd\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2} - \frac{bnx^2}{4e^2} + \frac{bx^2\log(cx^n)}{2e^2}$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
a*d**2*Piecewise((x**2/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**2), True))/(2*e
**2) - a*d*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))/e**2 +
 a*x**2/(2*e**2) - b*d**2*n*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-log(x)/
(d*e) + log(d/e + x**2)/(2*d*e), True))/(2*e**2) + b*d**2*Piecewise((x**2/
d**2, Eq(e, 0)), (-1/(d*e + e**2*x**2), True))*log(c*x**n)/(2*e**2) + b*d*
n*Piecewise((x**2/(2*d), Eq(e, 0)), (Piecewise((-polylog(2, e*x**2*exp_pol
ar(I*pi)/d)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2,
 e*x**2*exp_polar(I*pi)/d)/2, Abs(x) < 1), (-log(d)*log(1/x) - polylog(2,
e*x**2*exp_polar(I*pi)/d)/2, 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0
), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylo
g(2, e*x**2*exp_polar(I*pi)/d)/2, True))/e, True))/e**2 - b*d*Piecewise((x
**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))*log(c*x**n)/e**2 - b*n*x**2/(
4*e**2) + b*x**2*log(c*x**n)/(2*e**2)
```

3.221.7 Maxima [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
-1/2*a*(d^2/(e^4*x^2 + d*e^3) - x^2/e^2 + 2*d*log(e*x^2 + d)/e^3) + b*inte
grate((x^5*log(c) + x^5*log(x^n))/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

3.221.8 Giac [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/(e*x^2 + d)^2, x)
```

3.221.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{x^5\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^2}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

3.222 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

3.222.1 Optimal result

Integrand size = 23, antiderivative size = 95

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = -\frac{x^2(a+b\log(cx^n))}{2e(d+ex^2)}+\frac{bn\log(d+ex^2)}{4e^2} + \frac{(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^2}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^2}$$

output
```
-1/2*x^2*(a+b*ln(c*x^n))/e/(e*x^2+d)+1/4*b*n*ln(e*x^2+d)/e^2+1/2*(a+b*ln(c
*x^n))*ln(1+e*x^2/d)/e^2+1/4*b*n*polylog(2,-e*x^2/d)/e^2
```

3.222.2 Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.15 (sec) , antiderivative size = 321, normalized size of antiderivative = 3.38

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{\frac{2d(a-bn\log(x)+b\log(cx^n))}{d+ex^2}+2(a-bn\log(x)+b\log(cx^n))\log(d+ex^2)+\frac{bn\left(-2ex^2\log(x)+d\log\left(i\sqrt{d}-\sqrt{e}x\right)+ex^2\log\left(i\sqrt{\right.}\right.}{}}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
((2*d*(a - b*n*Log[x] + b*Log[c*x^n]))/(d + e*x^2) + 2*(a - b*n*Log[x] + b
*Log[c*x^n])*Log[d + e*x^2] + (b*n*(-2*e*x^2*Log[x] + d*Log[I*Sqrt[d] - Sq
rt[e]*x] + e*x^2*Log[I*Sqrt[d] - Sqrt[e]*x] + d*Log[I*Sqrt[d] + Sqrt[e]*x]
 + e*x^2*Log[I*Sqrt[d] + Sqrt[e]*x] + 2*d*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqr
t[d]] + 2*e*x^2*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 2*d*Log[x]*Log[1 +
 (I*Sqrt[e]*x)/Sqrt[d]] + 2*e*x^2*Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] +
2*(d + e*x^2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] + 2*(d + e*x^2)*PolyLog
[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(d + e*x^2))/(4*e^2)
```

3.222.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{x(a+b\log(cx^n))}{e(d+ex^2)}-\frac{dx(a+b\log(cx^n))}{e(d+ex^2)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e^2}-\frac{x^2(a+b\log(cx^n))}{2e(d+ex^2)}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^2}+\frac{bn\log(d+ex^2)}{4e^2}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
-1/2*(x^2*(a + b*Log[c*x^n]))/(e*(d + e*x^2)) + (b*n*Log[d + e*x^2])/(4*e^
2) + ((a + b*Log[c*x^n])*Log[1 + (e*x^2)/d])/(2*e^2) + (b*n*PolyLog[2, -((
e*x^2)/d)])/(4*e^2)
```

3.222.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.222.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.47 (sec) , antiderivative size = 305, normalized size of antiderivative = 3.21

method	result
risch	$\frac{b\ln(x^n)d}{2e^2(e\,x^2+d)}+\frac{b\ln(x^n)\ln(e\,x^2+d)}{2e^2}+\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e^2}+\frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e^2}-\frac{bn\ln(x)\ln(e\,x^2+d)}{2e^2}+\frac{bn\,\mathrm{dilog}\left(\right.}{2}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)*d/e^2/(e*x^2+d)+1/2*b*ln(x^n)/e^2*ln(e*x^2+d)+1/2*b*n/e^2*ln
(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n/e^2*ln(x)*ln((e*x+(-d*e)^
(1/2))/(-d*e)^(1/2))-1/2*b*n/e^2*ln(x)*ln(e*x^2+d)+1/2*b*n/e^2*dilog((-e*x
+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n/e^2*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(
1/2))+1/4*b*n*ln(e*x^2+d)/e^2-1/2*b*n/e^2*ln(x)+(-1/2*I*b*Pi*csgn(I*c)*csg
n(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csg
n(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/2*d/e^2/
(e*x^2+d)+1/2/e^2*ln(e*x^2+d))
```

3.222.5 Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

3.222.6 Sympy [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

3.222.7 Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
1/2*a*(d/(e^3*x^2 + d*e^2) + log(e*x^2 + d)/e^2) + b*integrate((x^3*log(c)
 + x^3*log(x^n))/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

3.222.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^2 + d)^2, x)
```

3.222.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^2}\,dx=\int \frac{x^3\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^2}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

3.223 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

3.223.1 Optimal result

Integrand size = 21, antiderivative size = 50

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{x^2(a+b\log(cx^n))}{2d(d+ex^2)} - \frac{bn\log(d+ex^2)}{4de}$$

output
```
1/2*x^2*(a+b*ln(c*x^n))/d/(e*x^2+d)-1/4*b*n*ln(e*x^2+d)/d/e
```

3.223.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 74, normalized size of antiderivative = 1.48

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = -\frac{2ad-2bn(d+ex^2)\log(x)+2bd\log(cx^n)+bdn\log(d+ex^2)+benx^2\log(d+ex^2)}{4de(d+ex^2)}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
-1/4*(2*a*d - 2*b*n*(d + e*x^2)*Log[x] + 2*b*d*Log[c*x^n] + b*d*n*Log[d +
e*x^2] + b*e*n*x^2*Log[d + e*x^2])/(d*e*(d + e*x^2))
```

3.223.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 50, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2773, 240}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}dx$$
$$\Big\downarrow \text{ 2773}$$
$$\frac{x^2(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\int \frac{x}{ex^2+d}dx}{2d}$$
$$\Big\downarrow \text{ 240}$$
$$\frac{x^2(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\log(d+ex^2)}{4de}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
(x^2*(a + b*Log[c*x^n]))/(2*d*(d + e*x^2)) - (b*n*Log[d + e*x^2])/(4*d*e)
```

3.223.3.1 Defintions of rubi rules used

rule 240
```
Int[(x_)/((a_) + (b_.)*(x_)^2), x_Symbol] :> Simp[Log[RemoveContent[a + b*x
^2, x]]/(2*b), x] /; FreeQ[{a, b}, x]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

3.223.4 Maple [A] (verified)

Time = 0.43 (sec) , antiderivative size = 74, normalized size of antiderivative = 1.48

method	result
parallelrisch	$\frac{-\ln(ex^2+d)x^2ben^2+2x^2\ln(cx^n)ben-\ln(ex^2+d)bdn^2-2adn}{4den(ex^2+d)}$
risch	$-\frac{b\ln(x^n)}{2e(ex^2+d)}-\frac{-i\pi bd\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(icx^n)+i\pi bd\,\mathrm{csgn}(ic)\,\mathrm{csgn}(icx^n)^2+i\pi bd\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(icx^n)^2-i\pi bd\,\mathrm{csgn}(}{4(ex^2+d)ed}$

input
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/4*(-ln(e*x^2+d)*x^2*b*e*n^2+2*x^2*ln(c*x^n)*b*e*n-ln(e*x^2+d)*b*d*n^2-2*
a*d*n)/d/e/n/(e*x^2+d)
```

3.223.5 Fricas [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.22

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{2\,benx^2\log(x)-2\,bd\log(c)-2\,ad-(benx^2+bdn)\log(ex^2+d)}{4\,(de^2x^2+d^2e)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
1/4*(2*b*e*n*x^2*log(x) - 2*b*d*log(c) - 2*a*d - (b*e*n*x^2 + b*d*n)*log(e
*x^2 + d))/(d*e^2*x^2 + d^2*e)
```

3.223.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 292 vs. $2(39) = 78$.

Time = 23.12 (sec) , antiderivative size = 292, normalized size of antiderivative = 5.84

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \begin{cases} \tilde{\infty}\left(-\frac{a}{2x^2}-\frac{bn}{4x^2}-\frac{b\log(cx^n)}{2x^2}\right) \\ \frac{\frac{ax^2}{2}-\frac{bnx^2}{4}+\frac{bx^2\log(cx^n)}{2}}{d^2} \\ \frac{-\frac{a}{2x^2}-\frac{bn}{4x^2}-\frac{b\log(cx^n)}{2x^2}}{e^2} \\ -\frac{2ad}{4d^2e+4de^2x^2}-\frac{bdn\log\left(x-\sqrt{-\frac{d}{e}}\right)}{4d^2e+4de^2x^2}-\frac{bdn\log\left(x+\sqrt{-\frac{d}{e}}\right)}{4d^2e+4de^2x^2}-\frac{benx^2\log\left(x-\sqrt{-\frac{d}{e}}\right)}{4d^2e+4de^2x^2}-\frac{benx^2\log\left(x+\sqrt{-\frac{d}{e}}\right)}{4d^2e+4de^2x^2}+\frac{2bex^2\log(cx^n)}{4d^2e+4de^2x^2} \end{cases}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d
, 0) & Eq(e, 0)), ((a*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**2, Eq
(e, 0)), ((-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**2, Eq(d
, 0)), (-2*a*d/(4*d**2*e + 4*d*e**2*x**2) - b*d*n*log(x - sqrt(-d/e))/(4*d
**2*e + 4*d*e**2*x**2) - b*d*n*log(x + sqrt(-d/e))/(4*d**2*e + 4*d*e**2*x*
*2) - b*e*n*x**2*log(x - sqrt(-d/e))/(4*d**2*e + 4*d*e**2*x**2) - b*e*n*x*
*2*log(x + sqrt(-d/e))/(4*d**2*e + 4*d*e**2*x**2) + 2*b*e*x**2*log(c*x**n)
/(4*d**2*e + 4*d*e**2*x**2), True))
```

3.223.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.42

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = -\frac{1}{4}bn\left(\frac{\log(ex^2+d)}{de}-\frac{\log(x^2)}{de}\right)-\frac{b\log(cx^n)}{2(e^2x^2+de)}-\frac{a}{2(e^2x^2+de)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
-1/4*b*n*(log(e*x^2 + d)/(d*e) - log(x^2)/(d*e)) - 1/2*b*log(c*x^n)/(e^2*x
^2 + d*e) - 1/2*a/(e^2*x^2 + d*e)
```

3.223.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.42

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = -\frac{bn\log(x)}{2(e^2x^2+de)} - \frac{bn\log(ex^2+d)}{4de} + \frac{bn\log(x)}{2de} - \frac{b\log(c)+a}{2(e^2x^2+de)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
-1/2*b*n*log(x)/(e^2*x^2 + d*e) - 1/4*b*n*log(e*x^2 + d)/(d*e) + 1/2*b*n*l
og(x)/(d*e) - 1/2*(b*log(c) + a)/(e^2*x^2 + d*e)
```

3.223.9 Mupad [B] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.46

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{b\,n\,\ln(x)}{2\,d\,e} - \frac{b\,\ln(c\,x^n)}{2\,(e^2\,x^2+d\,e)} - \frac{b\,n\,\ln(e\,x^2+d)}{4\,d\,e} - \frac{a}{2\,e^2\,x^2+2\,d\,e}$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

output
```
(b*n*log(x))/(2*d*e) - (b*log(c*x^n))/(2*(d*e + e^2*x^2)) - (b*n*log(d + e
*x^2))/(4*d*e) - a/(2*d*e + 2*e^2*x^2)
```

3.224 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx$

3.224.1 Optimal result

Integrand size = 23, antiderivative size = 82

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx = \frac{a+b\log(cx^n)}{2d(d+ex^2)} - \frac{\log\left(1+\frac{d}{ex^2}\right)(2a-bn+2b\log(cx^n))}{4d^2} + \frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^2}$$

output
```
1/2*(a+b*ln(c*x^n))/d/(e*x^2+d)-1/4*ln(1+d/e/x^2)*(2*a-b*n+2*b*ln(c*x^n))/
d^2+1/4*b*n*polylog(2,-d/e/x^2)/d^2
```

3.224.2 Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.26 (sec) , antiderivative size = 279, normalized size of antiderivative = 3.40

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx = \frac{a-bn\log(x)+b\log(cx^n)}{2d^2+2dex^2} + \frac{\log(x)(a-bn\log(x)+b\log(cx^n))}{d^2} - \frac{(a-bn\log(x)+b\log(cx^n))\log(d+ex^2)}{2d^2} + \frac{bn\left(\frac{\sqrt{ex}\log(x)}{i\sqrt{d}-\sqrt{ex}} - \frac{\sqrt{ex}\log(x)}{i\sqrt{d}+\sqrt{ex}} + 2\log^2(x) + \log\left(i\sqrt{d}-\sqrt{ex}\right) + \log\left(i\sqrt{d}+\sqrt{ex}\right) - 2\left(\log(x)\log\left(1+\frac{i\sqrt{ex}}{\sqrt{d}}\right.\right.\right.}{4d^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)^2),x]
```

output
```
(a - b*n*Log[x] + b*Log[c*x^n])/(2*d^2 + 2*d*e*x^2) + (Log[x]*(a - b*n*Log
[x] + b*Log[c*x^n]))/d^2 - ((a - b*n*Log[x] + b*Log[c*x^n])*Log[d + e*x^2]
)/(2*d^2) + (b*n*((Sqrt[e]*x*Log[x])/(I*Sqrt[d] - Sqrt[e]*x) - (Sqrt[e]*x*
Log[x])/(I*Sqrt[d] + Sqrt[e]*x) + 2*Log[x]^2 + Log[I*Sqrt[d] - Sqrt[e]*x]
+ Log[I*Sqrt[d] + Sqrt[e]*x] - 2*(Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] +
PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]) - 2*(Log[x]*Log[1 - (I*Sqrt[e]*x)/Sq
rt[d]] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])))/(4*d^2)
```

3.224.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.10, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2785, 25, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}dx$$

$$\Big\downarrow \ 2785$$

$$\frac{a+b\log(cx^n)}{2d(d+ex^2)}-\frac{\int -\frac{2a-bn+2b\log(cx^n)}{x(ex^2+d)}dx}{2d}$$

$$\Big\downarrow \ 25$$

$$\frac{\int \frac{2a-bn+2b\log(cx^n)}{x(ex^2+d)}dx}{2d}+\frac{a+b\log(cx^n)}{2d(d+ex^2)}$$

$$\Big\downarrow \ 2779$$

$$\frac{\frac{bn\int \frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(2a+2b\log(cx^n)-bn)}{2d}}{2d}+\frac{a+b\log(cx^n)}{2d(d+ex^2)}$$

$$\Big\downarrow \ 2838$$

$$\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{2d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(2a+2b\log(cx^n)-bn)}{2d}}{2d}+\frac{a+b\log(cx^n)}{2d(d+ex^2)}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)^2),x]
```

output
```
(a + b*Log[c*x^n])/(2*d*(d + e*x^2)) + (-1/2*(Log[1 + d/(e*x^2)]*(2*a - b*
n + 2*b*Log[c*x^n]))/d + (b*n*PolyLog[2, -(d/(e*x^2))])/(2*d))/(2*d)
```

3.224.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.224.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.59 (sec) , antiderivative size = 338, normalized size of antiderivative = 4.12

method	result
risch	$\frac{b\ln(x^n)}{2d(e\,x^2+d)} - \frac{b\ln(x^n)\ln(e\,x^2+d)}{2d^2} + \frac{b\ln(x^n)\ln(x)}{d^2} + \frac{bn\ln(e\,x^2+d)}{4d^2} - \frac{bn\ln(x)}{2d^2} - \frac{bn\ln(x)^2}{2d^2} + \frac{bn\ln(x)\ln(e\,x^2+d)}{2d^2} - \frac{bn\ln}{}$

input
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/d/(e*x^2+d)-1/2*b*ln(x^n)/d^2*ln(e*x^2+d)+b*ln(x^n)/d^2*ln(x
)+1/4*b*n/d^2*ln(e*x^2+d)-1/2*b*n/d^2*ln(x)-1/2*b*n/d^2*ln(x)^2+1/2*b*n/d^
2*ln(x)*ln(e*x^2+d)-1/2*b*n/d^2*ln(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))
-1/2*b*n/d^2*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/d^2*dilog((
-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/d^2*dilog((e*x+(-d*e)^(1/2))/(-d*
e)^(1/2))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn
(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*cs
gn(I*c*x^n)^3+b*ln(c)+a)*(-1/2*e/d^2*(-d/e/(e*x^2+d)+1/e*ln(e*x^2+d))+1/d^
2*ln(x))
```

3.224.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^5 + 2*d*e*x^3 + d^2*x), x)
```

3.224.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx=\text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**2,x)
```

output
```
Timed out
```

3.224.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
1/2*a*(1/(d*e*x^2 + d^2) - log(e*x^2 + d)/d^2 + 2*log(x)/d^2) + b*integrat
e((log(c) + log(x^n))/(e^2*x^5 + 2*d*e*x^3 + d^2*x), x)
```

3.224.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^2*x), x)
```

3.224.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^2}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,(e\,x^2+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^2), x)
```

3.225 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx$

3.225.1 Optimal result

Integrand size = 23, antiderivative size = 126

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx = -\frac{bn}{2d^2x^2}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}-\frac{4a-bn+4b\log(cx^n)}{4d^2x^2}+\frac{e\log\left(1+\frac{d}{ex^2}\right)(4a-bn+4b\log(cx^n))}{4d^3}-\frac{ben\,\mathrm{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{2d^3}$$

output

```
-1/2*b*n/d^2/x^2+1/2*(a+b*ln(c*x^n))/d/x^2/(e*x^2+d)+1/4*(-4*a+b*n-4*b*ln(
c*x^n))/d^2/x^2+1/4*e*ln(1+d/e/x^2)*(4*a-b*n+4*b*ln(c*x^n))/d^3-1/2*b*e*n*
polylog(2,-d/e/x^2)/d^3
```

3.225.2 Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.35 (sec) , antiderivative size = 334, normalized size of antiderivative = 2.65

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx = \frac{-\frac{2d(a-bn\log(x)+b\log(cx^n))}{x^2}-\frac{2de(a-bn\log(x)+b\log(cx^n))}{d+ex^2}-8e\log(x)(a-bn\log(x)+b\log(cx^n))+4e(a-bn\log(}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^2),x]
```

output
```
((-2*d*(a - b*n*Log[x] + b*Log[c*x^n]))/x^2 - (2*d*e*(a - b*n*Log[x] + b*L
og[c*x^n]))/(d + e*x^2) - 8*e*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n]) + 4*e
*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d + e*x^2] + b*n*((e^(3/2)*x*Log[x])/
((-I)*Sqrt[d] + Sqrt[e]*x) - 4*e*Log[x]^2 - (d + 2*d*Log[x])/x^2 - e*Log[I
*Sqrt[d] - Sqrt[e]*x] + ((-I)*e^(3/2)*x*Log[x] + e*(-Sqrt[d] + I*Sqrt[e]*x
)*Log[I*Sqrt[d] + Sqrt[e]*x])/(Sqrt[d] - I*Sqrt[e]*x) + 4*e*(Log[x]*Log[1
+ (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]) + 4*e*(Lo
g[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])))
/(4*d^3)
```

3.225.3 Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.06, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2785, 25, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}dx$$

$$\Big\downarrow \text{2785}$$

$$\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}-\frac{\int -\frac{4a-bn+4b\log(cx^n)}{x^3(ex^2+d)}dx}{2d}$$

$$\Big\downarrow \text{25}$$

$$\frac{\int \frac{4a-bn+4b\log(cx^n)}{x^3(ex^2+d)}dx}{2d}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}$$

$$\Big\downarrow \text{2780}$$

$$\frac{\frac{\int \frac{4a-bn+4b\log(cx^n)}{x^3}dx}{d}-\frac{e\int \frac{4a-bn+4b\log(cx^n)}{x\left(ex^2+d\right)}dx}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}$$

$$\Big\downarrow \text{2741}$$

$$\frac{\frac{-\frac{4a+4b\log(cx^n)-bn}{2x^2}-\frac{bn}{x^2}}{d}-\frac{e\int \frac{4a-bn+4b\log(cx^n)}{x\left(ex^2+d\right)}dx}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}$$

$$\Big\downarrow \text{2779}$$

$$\frac{\frac{-\frac{4a+4b\log(cx^n)-bn}{2x^2}-\frac{bn}{x^2}}{d}-\frac{e\left(\frac{2bn\int\frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(4a+4b\log(cx^n)-bn)}{2d}\right)}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{-\frac{4a+4b\log(cx^n)-bn}{2x^2}-\frac{bn}{x^2}}{d}-\frac{e\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(4a+4b\log(cx^n)-bn)}{2d}\right)}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^2(d+ex^2)}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^2),x]
```

output
```
(a + b*Log[c*x^n])/(2*d*x^2*(d + e*x^2)) + ((-((b*n)/x^2) - (4*a - b*n + 4
*b*Log[c*x^n])/(2*x^2))/d - (e*(-1/2*(Log[1 + d/(e*x^2)]*(4*a - b*n + 4*b*
Log[c*x^n]))/d + (b*n*PolyLog[2, -(d/(e*x^2))])/d))/d)/(2*d)
```

3.225.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.225.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.69 (sec) , antiderivative size = 380, normalized size of antiderivative = 3.02

method	result
risch	$-\frac{b\ln(x^n)e}{2d^2(e\,x^2+d)}+\frac{b\ln(x^n)e\ln(e\,x^2+d)}{d^3}-\frac{b\ln(x^n)}{2d^2x^2}-\frac{2b\ln(x^n)e\ln(x)}{d^3}+\frac{bne\ln(x)^2}{d^3}-\frac{bne\ln(x)\ln(e\,x^2+d)}{d^3}+\frac{bne\ln(x)\ln\big(}{d^3}$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)*e/d^2/(e*x^2+d)+b*ln(x^n)*e/d^3*ln(e*x^2+d)-1/2*b*ln(x^n)/d
^2/x^2-2*b*ln(x^n)/d^3*e*ln(x)+b*n/d^3*e*ln(x)^2-b*n/d^3*e*ln(x)*ln(e*x^2+
d)+b*n/d^3*e*ln(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+b*n/d^3*e*ln(x)*ln
((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+b*n/d^3*e*dilog((-e*x+(-d*e)^(1/2))/(-d*
e)^(1/2))+b*n/d^3*e*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n*e/d^3*l
n(e*x^2+d)-1/4*b*n/d^2/x^2+1/2*b*n/d^3*e*ln(x)+(-1/2*I*b*Pi*csgn(I*c)*csgn
(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn
(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/2*e^2/d^3
*(-d/e/(e*x^2+d)+2/e*ln(e*x^2+d))-1/2/d^2/x^2-2/d^3*e*ln(x))
```

3.225.5 Fricas [F]

$$\int \frac{a + b\log(cx^n)}{x^3 (d + ex^2)^2} \, dx = \int \frac{b\log(cx^n) + a}{(ex^2 + d)^2 x^3} \, dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^7 + 2*d*e*x^5 + d^2*x^3), x)
```

3.225.6 Sympy [A] (verification not implemented)

Time = 157.73 (sec) , antiderivative size = 364, normalized size of antiderivative = 2.89

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx = \frac{ae^2\left(\begin{cases}\frac{x^2}{2d^2} & \text{for } e=0\\ -\frac{1}{2de+2e^2x^2} & \text{otherwise}\end{cases}\right)}{d^2} - \frac{a}{2d^2x^2} - \frac{2ae\log(x)}{d^3} + \frac{ae\log(d+ex^2)}{d^3} - \frac{be^2n\left(\begin{cases}\frac{x^2}{2d^2} & \text{for } e=0\\ -\frac{\log(x)}{de}+\frac{\log\left(\frac{d}{e}+x^2\right)}{2de} & \text{otherwise}\end{cases}\right)}{2d^2} + \frac{be^2\left(\begin{cases}\frac{x^2}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2d^2} - \frac{bn}{4d^2x^2} - \frac{b\log(cx^n)}{2d^2x^2} - \frac{be^2n\left(\begin{cases}\frac{x^2}{2d} \\ \frac{\begin{cases}-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(d)\log(x)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise}\end{cases}}{e}\end{cases}\right)}{d^3} + \frac{be^2\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3} + \frac{ben\log(x^2)^2}{4d^3} - \frac{be\log(x^2)\log(cx^n)}{d^3}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**2,x)
```

output
```
a*e**2*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-1/(2*d*e + 2*e**2*x**2), Tru
e))/d**2 - a/(2*d**2*x**2) - 2*a*e*log(x)/d**3 + a*e*log(d + e*x**2)/d**3
- b*e**2*n*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-log(x)/(d*e) + log(d/e +
 x**2)/(2*d*e), True))/(2*d**2) + b*e**2*Piecewise((x**2/d**2, Eq(e, 0)),
(-1/(d*e + e**2*x**2), True))*log(c*x**n)/(2*d**2) - b*n/(4*d**2*x**2) - b
*log(c*x**n)/(2*d**2*x**2) - b*e**2*n*Piecewise((x**2/(2*d), Eq(e, 0)), (P
iecewise((-polylog(2, e*x**2*exp_polar(I*pi)/d)/2, (Abs(x) < 1) & (1/Abs(x
) < 1)), (log(d)*log(x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, Abs(x) <
 1), (-log(d)*log(1/x) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, 1/Abs(x)
< 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), (
)), ((), (0, 0)), x)*log(d) - polylog(2, e*x**2*exp_polar(I*pi)/d)/2, True
))/e, True))/d**3 + b*e**2*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/
e, True))*log(c*x**n)/d**3 + b*e*n*log(x**2)**2/(4*d**3) - b*e*log(x**2)*l
og(c*x**n)/d**3
```

3.225.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
-1/2*a*((2*e*x^2 + d)/(d^2*e*x^4 + d^3*x^2) - 2*e*log(e*x^2 + d)/d^3 + 4*e
*log(x)/d^3) + b*integrate((log(c) + log(x^n))/(e^2*x^7 + 2*d*e*x^5 + d^2*
x^3), x)
```

3.225.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^2*x^3), x)
```

3.225.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)^2}\,dx = \int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\left(e\,x^2+d\right)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^2), x)
```

3.226 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

3.226.1 Optimal result

Integrand size = 23, antiderivative size = 191

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{ax}{e^2}-\frac{bnx}{e^2}-\frac{b\sqrt{d}n\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{bx\log(cx^n)}{e^2}+\frac{dx(a+b\log(cx^n))}{2e^2(d+ex^2)}-\frac{3\sqrt{d}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{5/2}}+\frac{3ib\sqrt{d}n\,\mathrm{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4e^{5/2}}-\frac{3ib\sqrt{d}n\,\mathrm{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4e^{5/2}}$$

output
```
a*x/e^2-b*n*x/e^2+b*x*ln(c*x^n)/e^2+1/2*d*x*(a+b*ln(c*x^n))/e^2/(e*x^2+d)-
1/2*b*n*arctan(x*e^(1/2)/d^(1/2))*d^(1/2)/e^(5/2)-3/2*arctan(x*e^(1/2)/d^(
1/2))*(a+b*ln(c*x^n))*d^(1/2)/e^(5/2)+3/4*I*b*n*polylog(2,-I*x*e^(1/2)/d^(
1/2))*d^(1/2)/e^(5/2)-3/4*I*b*n*polylog(2,I*x*e^(1/2)/d^(1/2))*d^(1/2)/e^(
5/2)
```

3.226.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 296, normalized size of antiderivative = 1.55

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$= \frac{4a\sqrt{e}x-4b\sqrt{e}nx+4b\sqrt{e}x\log(cx^n)-\frac{d(a+b\log(cx^n))}{\sqrt{-d}-\sqrt{e}x}+\frac{d(a+b\log(cx^n))}{\sqrt{-d}+\sqrt{e}x}+\frac{bdn(\log(x)-\log(\sqrt{-d}-\sqrt{e}x))}{\sqrt{-d}}+b\sqrt{-d}n(\mathrm{lo}}{}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
(4*a*Sqrt[e]*x - 4*b*Sqrt[e]*n*x + 4*b*Sqrt[e]*x*Log[c*x^n] - (d*(a + b*Lo
g[c*x^n]))/(Sqrt[-d] - Sqrt[e]*x) + (d*(a + b*Log[c*x^n]))/(Sqrt[-d] + Sqr
t[e]*x) + (b*d*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/Sqrt[-d] + b*Sqrt[-
d]*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]) - 3*Sqrt[-d]*(a + b*Log[c*x^n])*
Log[1 + (Sqrt[e]*x)/Sqrt[-d]] + 3*Sqrt[-d]*(a + b*Log[c*x^n])*Log[1 + (d*S
qrt[e]*x)/(-d)^(3/2)] + 3*b*Sqrt[-d]*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]] -
3*b*Sqrt[-d]*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(4*e^(5/2))
```

3.226.3 Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 191, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$\Big\downarrow \ 2793$$
$$\int \left(\frac{d^2(a+b\log(cx^n))}{e^2(d+ex^2)^2}-\frac{2d(a+b\log(cx^n))}{e^2(d+ex^2)}+\frac{a+b\log(cx^n)}{e^2}\right)dx$$
$$\Big\downarrow \ 2009$$
$$-\frac{3\sqrt{d}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{5/2}}+\frac{dx(a+b\log(cx^n))}{2e^2(d+ex^2)}+\frac{ax}{e^2}-\frac{b\sqrt{d}n\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2e^{5/2}}+\frac{bx\log(cx^n)}{e^2}+\frac{3ib\sqrt{d}n\,\mathrm{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4e^{5/2}}-\frac{3ib\sqrt{d}n\,\mathrm{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4e^{5/2}}-\frac{bnx}{e^2}$$

input
```
Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
(a*x)/e^2 - (b*n*x)/e^2 - (b*Sqrt[d]*n*ArcTan[(Sqrt[e]*x)/Sqrt[d]])/(2*e^(
5/2)) + (b*x*Log[c*x^n])/e^2 + (d*x*(a + b*Log[c*x^n]))/(2*e^2*(d + e*x^2)
) - (3*Sqrt[d]*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*e^(5/2))
 + (((3*I)/4)*b*Sqrt[d]*n*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]])/e^(5/2) -
(((3*I)/4)*b*Sqrt[d]*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])/e^(5/2)
```

3.226.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.226.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.52 (sec) , antiderivative size = 559, normalized size of antiderivative = 2.93

method	result
risch	$\frac{b\ln(x^n)dx}{2e^2(e\,x^2+d)}+\frac{3bd\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{2e^2\sqrt{de}}-\frac{3bd\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{2e^2\sqrt{de}}+\frac{b\ln(x^n)x}{e^2}-\frac{bnx}{e^2}-\frac{bnd\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{e^2\sqrt{-de}}+\frac{bnd}{}$

input
```
int(x^4*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)*d/e^2*x/(e*x^2+d)+3/2*b*d/e^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(
1/2))*n*ln(x)-3/2*b*d/e^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)+b*ln
(x^n)/e^2*x-b*n*x/e^2-b*n*d/e^2*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/
(-d*e)^(1/2))+b*n*d/e^2*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1
/2))-3/4*b*n*d/e^2/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+3/
4*b*n*d/e^2/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n*d/
e^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))+1/4*b*n*d/e*ln(x)/(e*x^2+d)/(-d*e)
^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2-1/4*b*n*d/e*ln(x)/(e*x^2+d
)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2+1/4*b*n*d^2/e^2*ln(
x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n*d^2
/e^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+(-1/
2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c
*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+
b*ln(c)+a)*(-d/e^2*(-1/2*x/(e*x^2+d)+3/2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2
)))+x/e^2)
```

3.226.5 Fricas [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx=\int \frac{(b\log(cx^n)+a)x^4}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x^4*log(c*x^n) + a*x^4)/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

3.226.6 Sympy [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx=\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$

input
```
integrate(x**4*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
Integral(x**4*(a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

3.226.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.226.8 Giac [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^4/(e*x^2 + d)^2, x)
```

3.226.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{x^4\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^2}\,dx$$

input
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

output
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

3.227 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

3.227.1 Optimal result

Integrand size = 23, antiderivative size = 164

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2\sqrt{d}e^{3/2}} - \frac{x(a+b\log(cx^n))}{2e(d+ex^2)} + \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}e^{3/2}} - \frac{ibn\operatorname{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4\sqrt{d}e^{3/2}} + \frac{ibn\operatorname{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4\sqrt{d}e^{3/2}}$$

output
```
-1/2*x*(a+b*ln(c*x^n))/e/(e*x^2+d)+1/2*b*n*arctan(x*e^(1/2)/d^(1/2))/e^(3/
2)/d^(1/2)+1/2*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/e^(3/2)/d^(1/2)-1
/4*I*b*n*polylog(2,-I*x*e^(1/2)/d^(1/2))/e^(3/2)/d^(1/2)+1/4*I*b*n*polylog
(2,I*x*e^(1/2)/d^(1/2))/e^(3/2)/d^(1/2)
```

3.227.2 Mathematica [A] (verified)

Time = 0.33 (sec) , antiderivative size = 258, normalized size of antiderivative = 1.57

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$= \frac{\frac{a+b\log(cx^n)}{\sqrt{-d}-\sqrt{e}x} - \frac{a+b\log(cx^n)}{\sqrt{-d}+\sqrt{e}x} + \frac{bdn(\log(x)-\log(\sqrt{-d}-\sqrt{e}x))}{(-d)^{3/2}} + \frac{bn(\log(x)-\log(\sqrt{-d}+\sqrt{e}x))}{\sqrt{-d}} + \frac{d(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{3/2}} + \frac{(a+b}{}}{4e^{3/2}}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
((a + b*Log[c*x^n])/(Sqrt[-d] - Sqrt[e]*x) - (a + b*Log[c*x^n])/(Sqrt[-d]
+ Sqrt[e]*x) + (b*d*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/(-d)^(3/2) + (
b*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/Sqrt[-d] + (d*(a + b*Log[c*x^n])
*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3/2) + ((a + b*Log[c*x^n])*Log[1 + (
d*Sqrt[e]*x)/(-d)^(3/2)])/Sqrt[-d] + (b*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]]
)/Sqrt[-d] + (b*d*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(3/2))/(4*e
^(3/2))
```

3.227.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 164, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$\Big\downarrow \text{ 2793}$$
$$\int \left(\frac{a+b\log(cx^n)}{e(d+ex^2)} - \frac{d(a+b\log(cx^n))}{e(d+ex^2)^2}\right)dx$$
$$\Big\downarrow \text{ 2009}$$

$$\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}e^{3/2}}-\frac{x(a+b\log(cx^n))}{2e(d+ex^2)}+\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2\sqrt{d}e^{3/2}}-\frac{ibn\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4\sqrt{d}e^{3/2}}+\frac{ibn\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4\sqrt{d}e^{3/2}}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
(b*n*ArcTan[(Sqrt[e]*x)/Sqrt[d]])/(2*Sqrt[d]*e^(3/2)) - (x*(a + b*Log[c*x^
n]))/(2*e*(d + e*x^2)) + (ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/
(2*Sqrt[d]*e^(3/2)) - ((I/4)*b*n*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]])/(Sq
rt[d]*e^(3/2)) + ((I/4)*b*n*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])/(Sqrt[d]*e^
(3/2))
```

3.227.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.227.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.49 (sec) , antiderivative size = 516, normalized size of antiderivative = 3.15

method	result
risch	$-\frac{b\ln(x^n)x}{2e(e\,x^2+d)}-\frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{2e\sqrt{de}}+\frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{2e\sqrt{de}}+\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e\sqrt{-de}}-\frac{bn\ln(x)\ln\left(\frac{ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2e\sqrt{-de}}+$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)/e*x/(e*x^2+d)-1/2*b/e/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n
*ln(x)+1/2*b/e/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)+1/2*b*n/e*ln(x)
/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/e*ln(x)/(-d*e)^
(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/4*b*n/e/(-d*e)^(1/2)*dilog((-e
*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n/e/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1
/2))/(-d*e)^(1/2))+1/2*b*n/e/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))-1/4*b*n*l
n(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2+1/4*b
*n*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2-1/
4*b*n*d/e*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2)
)+1/4*b*n*d/e*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1
/2))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)
*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*
c*x^n)^3+b*ln(c)+a)*(-1/2/e*x/(e*x^2+d)+1/2/e/(d*e)^(1/2)*arctan(x*e/(d*e)
^(1/2)))
```

3.227.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

3.227.6 Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

3.227.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^2(a+b\log{(cx^n)})}{(d+ex^2)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.227.8 Giac [F]

$$\int \frac{x^2(a+b\log{(cx^n)})}{(d+ex^2)^2}\,dx = \int \frac{(b\log{(cx^n)}+a)x^2}{(ex^2+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^2 + d)^2, x)
```

3.227.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log{(cx^n)})}{(d+ex^2)^2}\,dx = \int \frac{x^2\,(a+b\,\ln{(c\,x^n)})}{(e\,x^2+d)^2}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

3.228 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx$

3.228.1 Optimal result

Integrand size = 20, antiderivative size = 164

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx = -\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}} + \frac{x(a+b\log(cx^n))}{2d(d+ex^2)} + \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}\sqrt{e}} - \frac{ibn\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4d^{3/2}\sqrt{e}} + \frac{ibn\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4d^{3/2}\sqrt{e}}$$

output
```
1/2*x*(a+b*ln(c*x^n))/d/(e*x^2+d)-1/2*b*n*arctan(x*e^(1/2)/d^(1/2))/d^(3/2
)/e^(1/2)+1/2*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(3/2)/e^(1/2)-1/
4*I*b*n*polylog(2,-I*x*e^(1/2)/d^(1/2))/d^(3/2)/e^(1/2)+1/4*I*b*n*polylog(
2,I*x*e^(1/2)/d^(1/2))/d^(3/2)/e^(1/2)
```

3.228.2 Mathematica [A] (verified)

Time = 0.33 (sec) , antiderivative size = 289, normalized size of antiderivative = 1.76

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx = \frac{1}{4}\left(\frac{a+b\log(cx^n)}{d\left(\sqrt{-d}\sqrt{e}+ex\right)}+\frac{a+b\log(cx^n)}{(-d)^{3/2}\sqrt{e}+dex}+\frac{bdn\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}x\right)\right)}{(-d)^{5/2}\sqrt{e}}+\frac{bn\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{(-d)^{3/2}\sqrt{e}}+\frac{(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{3/2}\sqrt{e}}+\frac{d(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}\sqrt{e}}+\frac{bdn\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}\sqrt{e}}+\frac{bn\,\mathrm{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{3/2}\sqrt{e}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^2)^2,x]
```

output
```
((a + b*Log[c*x^n])/(d*(Sqrt[-d]*Sqrt[e] + e*x)) + (a + b*Log[c*x^n])/((-d
)^(3/2)*Sqrt[e] + d*e*x) + (b*d*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/((
-d)^(5/2)*Sqrt[e]) + (b*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/((-d)^(3/2
)*Sqrt[e]) + ((a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/((-d)^(3/2
)*Sqrt[e]) + (d*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/((-d
)^(5/2)*Sqrt[e]) + (b*d*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/((-d)^(5/2)*Sq
rt[e]) + (b*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/((-d)^(3/2)*Sqrt[e]))/
4
```

3.228.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 160, normalized size of antiderivative = 0.98, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.300, Rules used = {2760, 218, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx$$

$$\Big\downarrow \text{2760}$$

$$\frac{\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{2d} - \frac{bn\int \frac{1}{ex^2+d}dx}{2d} + \frac{x(a+b\log(cx^n))}{2d(d+ex^2)}$$

$$\Big\downarrow \text{218}$$

$$\frac{\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{2d} + \frac{x(a+b\log(cx^n))}{2d(d+ex^2)} - \frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}$$

$$\Big\downarrow \text{2761}$$

$$\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}} - bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx}{2d} + \frac{x(a+b\log(cx^n))}{2d(d+ex^2)} - \frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}$$

$$\Big\downarrow \text{27}$$

$$\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}} - \frac{bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}}{2d} + \frac{x(a+b\log(cx^n))}{2d(d+ex^2)} - \frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}$$

$$\Big\downarrow \text{5355}$$

$$\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}} - \frac{bn\left(\frac{1}{2}i\int \frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx - \frac{1}{2}i\int \frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}dx\right)}{\sqrt{d}\sqrt{e}}}{2d} + \frac{x(a+b\log(cx^n))}{2d(d+ex^2)} - \frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}} - \frac{bn\left(\frac{1}{2}i\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right) - \frac{1}{2}i\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}}{2d} + \frac{x(a+b\log(cx^n))}{2d(d+ex^2)} - \frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^2)^2,x]
```

output
```
-1/2*(b*n*ArcTan[(Sqrt[e]*x)/Sqrt[d]])/(d^(3/2)*Sqrt[e]) + (x*(a + b*Log[c
*x^n]))/(2*d*(d + e*x^2)) + ((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n
]))/(Sqrt[d]*Sqrt[e]) - (b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] -
 (I/2)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e]))/(2*d)
```

3.228. $\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}dx$

3.228.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 218
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

rule 2760
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_), x_Sym
bol] :> Simp[(-x)*(d + e*x^2)^(q + 1)*((a + b*Log[c*x^n])/(2*d*(q + 1))), x
] + (Simp[(2*q + 3)/(2*d*(q + 1))   Int[(d + e*x^2)^(q + 1)*(a + b*Log[c*x^
n]), x], x] + Simp[b*(n/(2*d*(q + 1)))   Int[(d + e*x^2)^(q + 1), x], x]) /
; FreeQ[{a, b, c, d, e, n}, x] && LtQ[q, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

3.228.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.52 (sec) , antiderivative size = 449, normalized size of antiderivative = 2.74

method	result
risch	$\frac{bx\ln(x^n)}{2d(e\,x^2+d)}-\frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{2d\sqrt{de}}+\frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{2d\sqrt{de}}-\frac{bn\arctan\left(\frac{xe}{\sqrt{de}}\right)}{2d\sqrt{de}}+\frac{bn\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)x^2e}{4d(e\,x^2+d)\sqrt{-de}}-\frac{bn\ln(x)}{4d(e}$

input
```
int((a+b*ln(c*x^n))/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*x/d/(e*x^2+d)*ln(x^n)-1/2*b/d/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*n*
ln(x)+1/2*b/d/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)-1/2*b*n/d/(d*e)^
(1/2)*arctan(x*e/(d*e)^(1/2))+1/4*b*n*ln(x)/d/(e*x^2+d)/(-d*e)^(1/2)*ln((-
e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2*e-1/4*b*n*ln(x)/d/(e*x^2+d)/(-d*e)^(1/
2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2*e+1/4*b*n*ln(x)/(e*x^2+d)/(-d*e
)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n*ln(x)/(e*x^2+d)/(-d*e
)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/4*b*n/(-d*e)^(1/2)/d*dilog((
-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n/(-d*e)^(1/2)/d*dilog((e*x+(-d*e)^
(1/2))/(-d*e)^(1/2))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*
I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/
2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/2*x/d/(e*x^2+d)+1/2/d/(d*e)^(1/2)*a
rctan(x*e/(d*e)^(1/2)))
```

3.228.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

3.228.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx=\int \frac{a+b\log(cx^n)}{(d+ex^2)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

3.228.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx^n)}{(d + ex^2)^2} dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.228.8 Giac [F]

$$\int \frac{a + b\log(cx^n)}{(d + ex^2)^2} dx = \int \frac{b\log(cx^n) + a}{(ex^2 + d)^2} dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^2 + d)^2, x)
```

3.228.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{(d + ex^2)^2} dx = \int \frac{a + b\ln(c\,x^n)}{(e\,x^2 + d)^2} dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^2)^2,x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^2)^2, x)
```

3.229 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx$

3.229.1 Optimal result

Integrand size = 23, antiderivative size = 183

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx = -\frac{3bn}{2d^2x}+\frac{a+b\log(cx^n)}{2dx(d+ex^2)}-\frac{3a-bn+3b\log(cx^n)}{2d^2x} - \frac{\sqrt{e}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(3a-bn+3b\log(cx^n))}{2d^{5/2}} + \frac{3ib\sqrt{e}n\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4d^{5/2}}-\frac{3ib\sqrt{e}n\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4d^{5/2}}$$

output
```
-3/2*b*n/d^2/x+1/2*(a+b*ln(c*x^n))/d/x/(e*x^2+d)+1/2*(-3*a+b*n-3*b*ln(c*x^
n))/d^2/x-1/2*arctan(x*e^(1/2)/d^(1/2))*(3*a-b*n+3*b*ln(c*x^n))*e^(1/2)/d^
(5/2)+3/4*I*b*n*polylog(2,-I*x*e^(1/2)/d^(1/2))*e^(1/2)/d^(5/2)-3/4*I*b*n*
polylog(2,I*x*e^(1/2)/d^(1/2))*e^(1/2)/d^(5/2)
```

3.229.2 Mathematica [A] (verified)

Time = 0.48 (sec) , antiderivative size = 328, normalized size of antiderivative = 1.79

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx = \frac{1}{4}\left(-\frac{4bn}{d^2x}-\frac{4(a+b\log(cx^n))}{d^2x}+\frac{\sqrt{e}(a+b\log(cx^n))}{d^2(\sqrt{-d}-\sqrt{e}x)}-\frac{\sqrt{e}(a+b\log(cx^n))}{d^2(\sqrt{-d}+\sqrt{e}x)}+\frac{b\sqrt{e}n\left(-\log(x)+\log\left(\sqrt{-d}-\sqrt{e}x\right)\right)}{(-d)^{5/2}}+\frac{b\sqrt{e}n\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{(-d)^{5/2}}+\frac{3\sqrt{e}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}}-\frac{3\sqrt{e}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}}-\frac{3b\sqrt{e}n\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}}+\frac{3b\sqrt{e}n\,\mathrm{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^2),x]
```

output
```
((-4*b*n)/(d^2*x) - (4*(a + b*Log[c*x^n]))/(d^2*x) + (Sqrt[e]*(a + b*Log[c
*x^n]))/(d^2*(Sqrt[-d] - Sqrt[e]*x)) - (Sqrt[e]*(a + b*Log[c*x^n]))/(d^2*(
Sqrt[-d] + Sqrt[e]*x)) + (b*Sqrt[e]*n*(-Log[x] + Log[Sqrt[-d] - Sqrt[e]*x]
))/(-d)^(5/2) + (b*Sqrt[e]*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/(-d)^(5
/2) + (3*Sqrt[e]*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(5
/2) - (3*Sqrt[e]*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d
)^(5/2) - (3*b*Sqrt[e]*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(5/2) + (3
*b*Sqrt[e]*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(5/2))/4
```

3.229.3 Rubi [A] (verified)

Time = 0.63 (sec) , antiderivative size = 181, normalized size of antiderivative = 0.99, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.348, Rules used = {2785, 25, 2780, 2741, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}dx$$

$$\Big\downarrow \text{2785}$$

$$\frac{a+b\log(cx^n)}{2dx(d+ex^2)}-\frac{\int -\frac{3a-bn+3b\log(cx^n)}{x^2(ex^2+d)}dx}{2d}$$

$$\Big\downarrow \text{25}$$

$$\frac{\int \frac{3a-bn+3b\log(cx^n)}{x^2(ex^2+d)}dx}{2d}+\frac{a+b\log(cx^n)}{2dx(d+ex^2)}$$

$$\Big\downarrow \text{2780}$$

$$\frac{\frac{\int \frac{3a-bn+3b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{3a-bn+3b\log(cx^n)}{ex^2+d}dx}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx(d+ex^2)}$$

$$\Big\downarrow \text{2741}$$

$$\frac{\frac{-\frac{3a+3b\log(cx^n)-bn}{x}-\frac{3bn}{x}}{d}-\frac{e\int \frac{3a-bn+3b\log(cx^n)}{ex^2+d}dx}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx(d+ex^2)}$$

$$\Big\downarrow \text{2761}$$

$$\frac{\frac{-\frac{3a+3b\log(cx^n)-bn}{x}-\frac{3bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(3a+3b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-3bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx\right)}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx(d+ex^2)}$$

$$\Big\downarrow \text{27}$$

$$\frac{\frac{-\frac{3a+3b\log(cx^n)-bn}{x}-\frac{3bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(3a+3b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-\frac{3bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}\right)}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx(d+ex^2)}$$

$$\Big\downarrow \text{5355}$$

$$\frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)}+\frac{\frac{-\frac{3a+3b\log(cx^n)-bn}{x}-\frac{3bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(3a+3b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-\frac{3bn\left(\frac{1}{2}i\int\frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int\frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}dx\right)}{\sqrt{d}\sqrt{e}}\right)}{d}}{2d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{a+b\log\left(cx^n\right)}{2dx\left(d+ex^2\right)}+\frac{\frac{-\frac{3a+3b\log(cx^n)-bn}{x}-\frac{3bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(3a+3b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-\frac{3bn\left(\frac{1}{2}i\operatorname{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\operatorname{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}\right)}{d}}{2d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^2),x]
```

output
```
(a + b*Log[c*x^n])/(2*d*x*(d + e*x^2)) + (((-3*b*n)/x - (3*a - b*n + 3*b*L
og[c*x^n])/x)/d - (e*((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(3*a - b*n + 3*b*Log[c*
x^n]))/(Sqrt[d]*Sqrt[e]) - (3*b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[
d]] - (I/2)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e])))/d)/(2*
d)
```

3.229.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

3.229.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.60 (sec) , antiderivative size = 568, normalized size of antiderivative = 3.10

method	result
risch	$-\frac{b\ln(x^n)ex}{2d^2(e\,x^2+d)}+\frac{3be\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{2d^2\sqrt{de}}-\frac{3be\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{2d^2\sqrt{de}}-\frac{b\ln(x^n)}{d^2x}-\frac{bne\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right)}{2d^2\sqrt{-de}}+\frac{bne\ln(x)\ln}{2d^2}$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)/d^2*e*x/(e*x^2+d)+3/2*b*e/d^2/(d*e)^(1/2)*arctan(x*e/(d*e)^
(1/2))*n*ln(x)-3/2*b*e/d^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)-b*l
n(x^n)/d^2/x-1/2*b*n*e/d^2*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e
)^(1/2))+1/2*b*n*e/d^2*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/
2))-3/4*b*n*e/d^2/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+3/4
*b*n*e/d^2/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n*e/d
^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))-1/4*b*n*e^2/d^2*ln(x)/(e*x^2+d)/(-d
*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2+1/4*b*n*e^2/d^2*ln(x)/(
e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2-1/4*b*n*e/d*
ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/4*b*n*
e/d*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-b*n/d
^2/x+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)
*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*
c*x^n)^3+b*ln(c)+a)*(-e/d^2*(1/2*x/(e*x^2+d)+3/2/(d*e)^(1/2)*arctan(x*e/(d
*e)^(1/2)))-1/d^2/x)
```

3.229.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^6 + 2*d*e*x^4 + d^2*x^2), x)
```

3.229.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx = \int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*(d + e*x**2)**2), x)
```

3.229.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.229.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^2}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^2*x^2), x)
```

3.229.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^2}\,dx = \int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,\left(e\,x^2+d\right)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^2), x)
```

3.230 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}\,dx$

3.230.1 Optimal result

Integrand size = 23, antiderivative size = 224

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}\,dx =& -\frac{5bn}{18d^2x^3}+\frac{5ben}{2d^3x}+\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}\\&-\frac{5a-bn+5b\log(cx^n)}{6d^2x^3}+\frac{e(5a-bn+5b\log(cx^n))}{2d^3x}\\&+\frac{e^{3/2}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(5a-bn+5b\log(cx^n))}{2d^{7/2}}\\&-\frac{5ibe^{3/2}n\operatorname{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4d^{7/2}}+\frac{5ibe^{3/2}n\operatorname{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{4d^{7/2}}\end{aligned}$$

output
```
-5/18*b*n/d^2/x^3+5/2*b*e*n/d^3/x+1/2*(a+b*ln(c*x^n))/d/x^3/(e*x^2+d)+1/6*
(-5*a+b*n-5*b*ln(c*x^n))/d^2/x^3+1/2*e*(5*a-b*n+5*b*ln(c*x^n))/d^3/x+1/2*e
^(3/2)*arctan(x*e^(1/2)/d^(1/2))*(5*a-b*n+5*b*ln(c*x^n))/d^(7/2)-5/4*I*b*e
^(3/2)*n*polylog(2,-I*x*e^(1/2)/d^(1/2))/d^(7/2)+5/4*I*b*e^(3/2)*n*polylog
(2,I*x*e^(1/2)/d^(1/2))/d^(7/2)
```

3.230.2 Mathematica [A] (verified)

Time = 0.45 (sec) , antiderivative size = 361, normalized size of antiderivative = 1.61

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}\,dx = \frac{1}{36}\left(-\frac{4bn}{d^2x^3}+\frac{72ben}{d^3x}-\frac{12(a+b\log(cx^n))}{d^2x^3}+\frac{72e(a+b\log(cx^n))}{d^3x}-\frac{9e^{3/2}(a+b\log(cx^n))}{d^3\left(\sqrt{-d}-\sqrt{e}x\right)}+\frac{9e^{3/2}(a+b\log(cx^n))}{d^3\left(\sqrt{-d}+\sqrt{e}x\right)}-\frac{9be^{3/2}n\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}x\right)\right)}{(-d)^{7/2}}+\frac{9be^{3/2}n\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{(-d)^{7/2}}+\frac{45e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{7/2}}-\frac{45e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{7/2}}-\frac{45be^{3/2}n\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{7/2}}+\frac{45be^{3/2}n\,\mathrm{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{7/2}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^2),x]
```

output
```
((-4*b*n)/(d^2*x^3) + (72*b*e*n)/(d^3*x) - (12*(a + b*Log[c*x^n]))/(d^2*x^
3) + (72*e*(a + b*Log[c*x^n]))/(d^3*x) - (9*e^(3/2)*(a + b*Log[c*x^n]))/(d
^3*(Sqrt[-d] - Sqrt[e]*x)) + (9*e^(3/2)*(a + b*Log[c*x^n]))/(d^3*(Sqrt[-d]
 + Sqrt[e]*x)) - (9*b*e^(3/2)*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/(-d)
^(7/2) + (9*b*e^(3/2)*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/(-d)^(7/2) +
 (45*e^(3/2)*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(7/2)
- (45*e^(3/2)*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(
7/2) - (45*b*e^(3/2)*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(7/2) + (45*
b*e^(3/2)*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(7/2))/36
```

3.230.3 Rubi [A] (verified)

Time = 0.92 (sec) , antiderivative size = 226, normalized size of antiderivative = 1.01, number of steps used = 10, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.435$, Rules used = {2785, 25, 2780, 2741, 2780, 2741, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}dx$$

$$\Big\downarrow \text{2785}$$

$$\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}-\frac{\int -\frac{5a-bn+5b\log(cx^n)}{x^4(ex^2+d)}dx}{2d}$$

$$\Big\downarrow \text{25}$$

$$\frac{\int \frac{5a-bn+5b\log(cx^n)}{x^4(ex^2+d)}dx}{2d}+\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}$$

$$\Big\downarrow \text{2780}$$

$$\frac{\frac{\int \frac{5a-bn+5b\log(cx^n)}{x^4}dx}{d}-\frac{e\int \frac{5a-bn+5b\log(cx^n)}{x^2(ex^2+d)}dx}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}$$

$$\Big\downarrow \text{2741}$$

$$\frac{\frac{-\frac{5a+5b\log(cx^n)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\int \frac{5a-bn+5b\log(cx^n)}{x^2(ex^2+d)}dx}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}$$

$$\Big\downarrow \text{2780}$$

$$\frac{\frac{-\frac{5a+5b\log(cx^n)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\left(\frac{\int \frac{5a-bn+5b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{5a-bn+5b\log(cx^n)}{ex^2+d}dx}{d}\right)}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}$$

$$\Big\downarrow \text{2741}$$

$$\frac{\frac{-\frac{5a+5b\log(cx^n)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{5a+5b\log(cx^n)-bn}{x}-\frac{5bn}{x}}{d}-\frac{e\int \frac{5a-bn+5b\log(cx^n)}{ex^2+d}dx}{d}\right)}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}$$

$$\Big\downarrow \text{2761}$$

$$\frac{\frac{-\frac{5a+5b\log(cx^n)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{5a+5b\log(cx^n)-bn}{x}-\frac{5bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(5a+5b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-5bn\int\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx\right)}{d}\right)}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}$$

$$\Big\downarrow \; 27$$

$$\frac{\frac{-\frac{5a+5b\log(cx^n)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{5a+5b\log(cx^n)-bn}{x}-\frac{5bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(5a+5b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-\frac{5bn\int\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}\right)}{d}\right)}{d}}{2d}+\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}$$

$$\Big\downarrow \; 5355$$

$$\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}+\frac{\frac{-\frac{5a+5b\log(cx^n)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{5a+5b\log(cx^n)-bn}{x}-\frac{5bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(5a+5b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-\frac{5bn\left(\frac{1}{2}i\int\frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int\frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}d\right)}{\sqrt{d}\sqrt{e}}\right)}{d}\right)}{d}}{2d}$$

$$\Big\downarrow \; 2838$$

$$\frac{a+b\log(cx^n)}{2dx^3(d+ex^2)}+\frac{\frac{-\frac{5a+5b\log(cx^n)-bn}{3x^3}-\frac{5bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{5a+5b\log(cx^n)-bn}{x}-\frac{5bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(5a+5b\log(cx^n)-bn)}{\sqrt{d}\sqrt{e}}-\frac{5bn\left(\frac{1}{2}i\,\text{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\,\text{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}\right)}{d}\right)}{d}}{2d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^2),x]
```

3.230. $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}\,dx$

output
```
(a + b*Log[c*x^n])/(2*d*x^3*(d + e*x^2)) + (((-5*b*n)/(9*x^3) - (5*a - b*n
 + 5*b*Log[c*x^n])/(3*x^3))/d - (e*(((-5*b*n)/x - (5*a - b*n + 5*b*Log[c*x
^n])/x)/d - (e*((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(5*a - b*n + 5*b*Log[c*x^n]))
/(Sqrt[d]*Sqrt[e]) - (5*b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] -
(I/2)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e])))/d))/d)/(2*d)
```

3.230.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

3.230.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.86 (sec) , antiderivative size = 622, normalized size of antiderivative = 2.78

method	result
risch	$\frac{b\ln(x^n)e^2x}{2d^3(e\,x^2+d)} - \frac{5b\,e^2\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{2d^3\sqrt{de}} + \frac{5b\,e^2\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{2d^3\sqrt{de}} - \frac{b\ln(x^n)}{3d^2x^3} + \frac{2b\ln(x^n)e}{d^3x} + \frac{bn\,e^2\ln(x)\ln\left(\frac{-ex+\sqrt{-de}}{\sqrt{-de}}\right.}{d^3\sqrt{-de}}$

input
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)*e^2/d^3*x/(e*x^2+d)-5/2*b*e^2/d^3/(d*e)^(1/2)*arctan(x*e/(d*
e)^(1/2))*n*ln(x)+5/2*b*e^2/d^3/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n
)-1/3*b*ln(x^n)/d^2/x^3+2*b*ln(x^n)/d^3*e/x+b*n*e^2/d^3*ln(x)/(-d*e)^(1/2)
*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-b*n*e^2/d^3*ln(x)/(-d*e)^(1/2)*ln((e
*x+(-d*e)^(1/2))/(-d*e)^(1/2))+5/4*b*n*e^2/d^3/(-d*e)^(1/2)*dilog((-e*x+(-
d*e)^(1/2))/(-d*e)^(1/2))-5/4*b*n*e^2/d^3/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(
1/2))/(-d*e)^(1/2))-1/9*b*n/d^2/x^3-1/2*b*n*e^2/d^3/(d*e)^(1/2)*arctan(x*e
/(d*e)^(1/2))+1/4*b*n*e^3/d^3*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)
^(1/2))/(-d*e)^(1/2))*x^2-1/4*b*n*e^3/d^3*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln(
(e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2+1/4*b*n*e^2/d^2*ln(x)/(e*x^2+d)/(-d*e
)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n*e^2/d^2*ln(x)/(e*x^2+
d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+2*b*e*n/d^3/x+(-1/2*I*
b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n
)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln
(c)+a)*(e^2/d^3*(1/2*x/(e*x^2+d)+5/2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2)))-
1/3/d^2/x^3+2/d^3*e/x)
```

3.230.5 Fricas [F]

$$\int \frac{a + b\log(cx^n)}{x^4 (d + ex^2)^2} dx = \int \frac{b\log(cx^n) + a}{(ex^2 + d)^2 x^4} dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^8 + 2*d*e*x^6 + d^2*x^4), x)
```

3.230.6 Sympy [F]

$$\int \frac{a + b\log(cx^n)}{x^4 (d + ex^2)^2} dx = \int \frac{a + b\log(cx^n)}{x^4 (d + ex^2)^2} dx$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(x**4*(d + e*x**2)**2), x)
```

3.230.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx^n)}{x^4 (d + ex^2)^2} dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.230.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^2x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^2*x^4), x)
```

3.230.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^2}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^4\,(e\,x^2+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^2), x)
```

3.231 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

3.231.1 Optimal result

Integrand size = 23, antiderivative size = 152

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{bdn}{8e^3(d+ex^2)}+\frac{bn\log(x)}{4e^3}-\frac{d^2(a+b\log(cx^n))}{4e^3(d+ex^2)^2}-\frac{x^2(a+b\log(cx^n))}{e^2(d+ex^2)}+\frac{3bn\log(d+ex^2)}{8e^3}+\frac{(a+b\log(cx^n))\log\left(1+\frac{ex^2}{d}\right)}{2e^3}+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^3}$$

output
```
1/8*b*d*n/e^3/(e*x^2+d)+1/4*b*n*ln(x)/e^3-1/4*d^2*(a+b*ln(c*x^n))/e^3/(e*x
^2+d)^2-x^2*(a+b*ln(c*x^n))/e^2/(e*x^2+d)+3/8*b*n*ln(e*x^2+d)/e^3+1/2*(a+b
*ln(c*x^n))*ln(1+e*x^2/d)/e^3+1/4*b*n*polylog(2,-e*x^2/d)/e^3
```

3.231.2 Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.35 (sec) , antiderivative size = 498, normalized size of antiderivative = 3.28

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{-2d^2(a-bn\log(x)+b\log(cx^n))+8d(d+ex^2)(a-bn\log(x)+b\log(cx^n))+4(d+ex^2)^2(a-bn\log(x)}{}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
(-2*d^2*(a - b*n*Log[x] + b*Log[c*x^n]) + 8*d*(d + e*x^2)*(a - b*n*Log[x]
+ b*Log[c*x^n]) + 4*(d + e*x^2)^2*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d +
e*x^2] + b*n*(d^2 + d*e*x^2 - 4*d*e*x^2*Log[x] - 6*e^2*x^4*Log[x] + 3*d^2*
Log[I*Sqrt[d] - Sqrt[e]*x] + 6*d*e*x^2*Log[I*Sqrt[d] - Sqrt[e]*x] + 3*e^2*
x^4*Log[I*Sqrt[d] - Sqrt[e]*x] + 3*d^2*Log[I*Sqrt[d] + Sqrt[e]*x] + 6*d*e*
x^2*Log[I*Sqrt[d] + Sqrt[e]*x] + 3*e^2*x^4*Log[I*Sqrt[d] + Sqrt[e]*x] + 4*
d^2*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 8*d*e*x^2*Log[x]*Log[1 - (I*Sq
rt[e]*x)/Sqrt[d]] + 4*e^2*x^4*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 4*d^
2*Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + 8*d*e*x^2*Log[x]*Log[1 + (I*Sqrt
[e]*x)/Sqrt[d]] + 4*e^2*x^4*Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + 4*(d +
 e*x^2)^2*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] + 4*(d + e*x^2)^2*PolyLog[2
, (I*Sqrt[e]*x)/Sqrt[d]]))/(8*e^3*(d + e*x^2)^2)
```

3.231.3 Rubi [A] (verified)

Time = 0.48 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d^2x(a+b\log(cx^n))}{e^2(d+ex^2)^3}-\frac{2dx(a+b\log(cx^n))}{e^2(d+ex^2)^2}+\frac{x(a+b\log(cx^n))}{e^2(d+ex^2)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{4e^3(d+ex^2)^2}+\frac{\log\left(\frac{ex^2}{d}+1\right)(a+b\log(cx^n))}{2e^3}-\frac{x^2(a+b\log(cx^n))}{e^2(d+ex^2)}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex^2}{d}\right)}{4e^3}+\frac{bdn}{8e^3(d+ex^2)}+\frac{3bn\log(d+ex^2)}{8e^3}+\frac{bn\log(x)}{4e^3}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
(b*d*n)/(8*e^3*(d + e*x^2)) + (b*n*Log[x])/(4*e^3) - (d^2*(a + b*Log[c*x^n
]))/(4*e^3*(d + e*x^2)^2) - (x^2*(a + b*Log[c*x^n]))/(e^2*(d + e*x^2)) + (
3*b*n*Log[d + e*x^2])/(8*e^3) + ((a + b*Log[c*x^n])*Log[1 + (e*x^2)/d])/(2
*e^3) + (b*n*PolyLog[2, -((e*x^2)/d)])/(4*e^3)
```

3.231.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.231.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.70 (sec) , antiderivative size = 359, normalized size of antiderivative = 2.36

method	result
risch	$\frac{b\ln(x^n)\ln(e\,x^2+d)}{2e^3}+\frac{b\ln(x^n)d}{e^3(e\,x^2+d)}-\frac{b\ln(x^n)d^2}{4e^3(e\,x^2+d)^2}+\frac{3bn\ln(e\,x^2+d)}{8e^3}+\frac{bdn}{8e^3(e\,x^2+d)}-\frac{3bn\ln(x)}{4e^3}-\frac{bn\ln(x)\ln(e\,x^2+d)}{2e^3}+$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/e^3*ln(e*x^2+d)+b*ln(x^n)*d/e^3/(e*x^2+d)-1/4*b*ln(x^n)*d^2/
e^3/(e*x^2+d)^2+3/8*b*n*ln(e*x^2+d)/e^3+1/8*b*d*n/e^3/(e*x^2+d)-3/4*b*n*ln
(x)/e^3-1/2*b*n/e^3*ln(x)*ln(e*x^2+d)+1/2*b*n/e^3*ln(x)*ln((-e*x+(-d*e)^(1
/2))/(-d*e)^(1/2))+1/2*b*n/e^3*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1
/2*b*n/e^3*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/2*b*n/e^3*dilog((e*x+
(-d*e)^(1/2))/(-d*e)^(1/2))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^
n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^
n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/2/e^3*ln(e*x^2+d)+d/e^3/(e*x
^2+d)-1/4*d^2/e^3/(e*x^2+d)^2)
```

3.231.5 Fricas [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex^2+d)^3}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*x^5*log(c*x^n) + a*x^5)/(e^3*x^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 +
 d^3), x)
```

3.231.6 Sympy [A] (verification not implemented)

Time = 63.33 (sec) , antiderivative size = 403, normalized size of antiderivative = 2.65

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$
$$= \frac{ad^2\left(\begin{cases}\frac{x^2}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex^2)^2} & \text{otherwise}\end{cases}\right)}{2e^2} - \frac{ad\left(\begin{cases}\frac{x^2}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x^2} & \text{otherwise}\end{cases}\right)}{e^2}$$
$$+ \frac{a\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)}{2e^2} - \frac{bd^2n\left(\begin{cases}\frac{x^2}{2d^3} & \text{for } e=0\\ -\frac{1}{4d^2e+4de^2x^2} - \frac{\log(x)}{2d^2e} + \frac{\log\left(\frac{d}{e}+x^2\right)}{4d^2e} & \text{otherwise}\end{cases}\right)}{2e^2}$$
$$+ \frac{bd^2\left(\begin{cases}\frac{x^2}{d^3} & \text{for } e=0\\ -\frac{1}{2e(d+ex^2)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2e^2}$$
$$+ \frac{bdn\left(\begin{cases}\frac{x^2}{2d^2} & \text{for } e=0\\ -\frac{\log(x)}{de} + \frac{\log\left(\frac{d}{e}+x^2\right)}{2de} & \text{otherwise}\end{cases}\right)}{e^2} - \frac{bd\left(\begin{cases}\frac{x^2}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2}$$
$$- \frac{bn\left(\begin{cases}\frac{x^2}{2d} & \\ \frac{\begin{cases}-\frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(d)\log(x) - \frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right) - \frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d) + G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d) - \frac{\operatorname{Li}_2\left(\frac{ex^2e^{i\pi}}{d}\right)}{2} & \text{otherwise}\end{cases}}{e} & \end{cases}\right)}{2e^2}$$
$$+ \frac{b\left(\begin{cases}\frac{x^2}{d} & \text{for } e=0\\ \frac{\log(d+ex^2)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2e^2}$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

3.231. $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

output
```
a*d**2*Piecewise((x**2/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x**2)**2), True))/
(2*e**2) - a*d*Piecewise((x**2/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**2), Tru
e))/e**2 + a*Piecewise((x**2/d, Eq(e, 0)), (log(d + e*x**2)/e, True))/(2*e
**2) - b*d**2*n*Piecewise((x**2/(2*d**3), Eq(e, 0)), (-1/(4*d**2*e + 4*d*e
**2*x**2) - log(x)/(2*d**2*e) + log(d/e + x**2)/(4*d**2*e), True))/(2*e**2
) + b*d**2*Piecewise((x**2/d**3, Eq(e, 0)), (-1/(2*e*(d + e*x**2)**2), Tru
e))*log(c*x**n)/(2*e**2) + b*d*n*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-lo
g(x)/(d*e) + log(d/e + x**2)/(2*d*e), True))/e**2 - b*d*Piecewise((x**2/d*
*2, Eq(e, 0)), (-1/(d*e + e**2*x**2), True))*log(c*x**n)/e**2 - b*n*Piecew
ise((x**2/(2*d), Eq(e, 0)), (Piecewise((-polylog(2, e*x**2*exp_polar(I*pi)
/d)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - polylog(2, e*x**2*
exp_polar(I*pi)/d)/2, Abs(x) < 1), (-log(d)*log(1/x) - polylog(2, e*x**2*e
xp_polar(I*pi)/d)/2, 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()),
x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) - polylog(2, e*x
**2*exp_polar(I*pi)/d)/2, True))/e, True))/(2*e**2) + b*Piecewise((x**2/d,
 Eq(e, 0)), (log(d + e*x**2)/e, True))*log(c*x**n)/(2*e**2)
```

3.231.7 Maxima [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex^2+d)^3}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
1/4*a*((4*d*e*x^2 + 3*d^2)/(e^5*x^4 + 2*d*e^4*x^2 + d^2*e^3) + 2*log(e*x^2
 + d)/e^3) + b*integrate((x^5*log(c) + x^5*log(x^n))/(e^3*x^6 + 3*d*e^2*x^
4 + 3*d^2*e*x^2 + d^3), x)
```

3.231.8 Giac [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex^2+d)^3}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/(e*x^2 + d)^3, x)
```

3.231.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^3}\,dx=\int \frac{x^5\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^3}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^3, x)
```

3.232 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

3.232.1 Optimal result

Integrand size = 23, antiderivative size = 68

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = -\frac{bn}{8e^2(d+ex^2)} + \frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2} - \frac{bn\log(d+ex^2)}{8de^2}$$

output
```
-1/8*b*n/e^2/(e*x^2+d)+1/4*x^4*(a+b*ln(c*x^n))/d/(e*x^2+d)^2-1/8*b*n*ln(e*
x^2+d)/d/e^2
```

3.232.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 129, normalized size of antiderivative = 1.90

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = -\frac{2ad^2+bd^2n+4adex^2+bdenx^2-2bn(d+ex^2)^2\log(x)+2bd(d+2ex^2)\log(cx^n)+bd^2n\log(d+ex^2)}{8de^2(d+ex^2)^2}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
-1/8*(2*a*d^2 + b*d^2*n + 4*a*d*e*x^2 + b*d*e*n*x^2 - 2*b*n*(d + e*x^2)^2*
Log[x] + 2*b*d*(d + 2*e*x^2)*Log[c*x^n] + b*d^2*n*Log[d + e*x^2] + 2*b*d*e
*n*x^2*Log[d + e*x^2] + b*e^2*n*x^4*Log[d + e*x^2])/(d*e^2*(d + e*x^2)^2)
```

3.232.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 66, normalized size of antiderivative = 0.97, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2773, 243, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}dx$$

$$\Big\downarrow \text{2773}$$

$$\frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\int \frac{x^3}{(ex^2+d)^2}dx}{4d}$$

$$\Big\downarrow \text{243}$$

$$\frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\int \frac{x^2}{(ex^2+d)^2}dx^2}{8d}$$

$$\Big\downarrow \text{49}$$

$$\frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\int \left(\frac{1}{e(ex^2+d)}-\frac{d}{e(ex^2+d)^2}\right)dx^2}{8d}$$

$$\Big\downarrow \text{2009}$$

$$\frac{x^4(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{d}{e^2(d+ex^2)}+\frac{\log(d+ex^2)}{e^2}\right)}{8d}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
(x^4*(a + b*Log[c*x^n]))/(4*d*(d + e*x^2)^2) - (b*n*(d/(e^2*(d + e*x^2)) +
 Log[d + e*x^2]/e^2))/(8*d)
```

3.232.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

3.232.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 129 vs. $2(62) = 124$.

Time = 0.62 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.91

method	result
parallelrisch	$\frac{-\ln(e x^2+d)x^4 b e^2 n^2+2x^4\ln(c x^n) b e^2 n-2\ln(e x^2+d)x^2 bde n^2-x^2 bde n^2-\ln(e x^2+d) b d^2 n^2-4x^2 aden-b d^2 n^2-2a d^2 n}{8nd e^2(e x^2+d)^2}$
risch	$-\frac{b(2e x^2+d)\ln(x^n)}{4(e x^2+d)^2 e^2}-\frac{-2i\pi bde x^2\operatorname{csgn}(ic x^n)^3-2i\pi bde x^2\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(ic x^n)+i\pi b d^2\operatorname{csgn}(ix^n)\operatorname{csgn}(ic x^n)^2-i}{}$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
1/8*(-ln(e*x^2+d)*x^4*b*e^2*n^2+2*x^4*ln(c*x^n)*b*e^2*n-2*ln(e*x^2+d)*x^2*
b*d*e*n^2-x^2*b*d*e*n^2-ln(e*x^2+d)*b*d^2*n^2-4*x^2*a*d*e*n-b*d^2*n^2-2*a*
d^2*n)/n/d/e^2/(e*x^2+d)^2
```

3.232.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 126 vs. 2(62) = 124.

Time = 0.33 (sec) , antiderivative size = 126, normalized size of antiderivative = 1.85

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$
$$= \frac{2\,be^2nx^4\log(x) - bd^2n - 2\,ad^2 - (bden + 4\,ade)x^2 - (be^2nx^4 + 2\,bdenx^2 + bd^2n)\log(ex^2+d) - 2\,(2\,bde}{8\,(de^4x^4 + 2\,d^2e^3x^2 + d^3e^2)}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
1/8*(2*b*e^2*n*x^4*log(x) - b*d^2*n - 2*a*d^2 - (b*d*e*n + 4*a*d*e)*x^2 -
(b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*log(e*x^2 + d) - 2*(2*b*d*e*x^2 +
b*d^2)*log(c))/(d*e^4*x^4 + 2*d^2*e^3*x^2 + d^3*e^2)
```

3.232.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 612 vs. 2(58) = 116.

Time = 167.21 (sec) , antiderivative size = 612, normalized size of antiderivative = 9.00

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$
$$= \begin{cases} \tilde{\infty}\left(-\frac{a}{2x^2} - \frac{bn}{4x^2} - \frac{b\log(cx^n)}{2x^2}\right) \\ \frac{\frac{ax^4}{4} - \frac{bnx^4}{16} + \frac{bx^4\log(cx^n)}{4}}{d^3} \\ \frac{-\frac{a}{2x^2} - \frac{bn}{4x^2} - \frac{b\log(cx^n)}{2x^2}}{e^3} \\ -\frac{2ad^2}{8d^3e^2+16d^2e^3x^2+8de^4x^4} - \frac{4adex^2}{8d^3e^2+16d^2e^3x^2+8de^4x^4} - \frac{bd^2n\log\left(x-\sqrt{-\frac{d}{e}}\right)}{8d^3e^2+16d^2e^3x^2+8de^4x^4} - \frac{bd^2n\log\left(x+\sqrt{-\frac{d}{e}}\right)}{8d^3e^2+16d^2e^3x^2+8de^4x^4} - \frac{bd^2n}{8d^3e^2+16d^2e^3x^2} \end{cases}$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

output
```
Piecewise((zoo*(-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2)), Eq(d
, 0) & Eq(e, 0)), ((a*x**4/4 - b*n*x**4/16 + b*x**4*log(c*x**n)/4)/d**3, E
q(e, 0)), ((-a/(2*x**2) - b*n/(4*x**2) - b*log(c*x**n)/(2*x**2))/e**3, Eq(
d, 0)), (-2*a*d**2/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**4) - 4*a
*d*e*x**2/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**4) - b*d**2*n*log
(x - sqrt(-d/e))/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**4) - b*d**
2*n*log(x + sqrt(-d/e))/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**4)
- b*d**2*n/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**4) - 2*b*d*e*n*x
**2*log(x - sqrt(-d/e))/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x**4)
- 2*b*d*e*n*x**2*log(x + sqrt(-d/e))/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*
d*e**4*x**4) - b*d*e*n*x**2/(8*d**3*e**2 + 16*d**2*e**3*x**2 + 8*d*e**4*x*
*4) - b*e**2*n*x**4*log(x - sqrt(-d/e))/(8*d**3*e**2 + 16*d**2*e**3*x**2 +
 8*d*e**4*x**4) - b*e**2*n*x**4*log(x + sqrt(-d/e))/(8*d**3*e**2 + 16*d**2
*e**3*x**2 + 8*d*e**4*x**4) + 2*b*e**2*x**4*log(c*x**n)/(8*d**3*e**2 + 16*
d**2*e**3*x**2 + 8*d*e**4*x**4), True))
```

3.232.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 128 vs. $2(62) = 124$.

Time = 0.20 (sec) , antiderivative size = 128, normalized size of antiderivative = 1.88

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = -\frac{1}{8}\,bn\left(\frac{1}{e^3x^2+de^2}+\frac{\log(ex^2+d)}{de^2}-\frac{\log(x^2)}{de^2}\right) - \frac{(2\,ex^2+d)b\log(cx^n)}{4\,(e^4x^4+2\,de^3x^2+d^2e^2)} - \frac{(2\,ex^2+d)a}{4\,(e^4x^4+2\,de^3x^2+d^2e^2)}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
-1/8*b*n*(1/(e^3*x^2 + d*e^2) + log(e*x^2 + d)/(d*e^2) - log(x^2)/(d*e^2))
 - 1/4*(2*e*x^2 + d)*b*log(c*x^n)/(e^4*x^4 + 2*d*e^3*x^2 + d^2*e^2) - 1/4*
(2*e*x^2 + d)*a/(e^4*x^4 + 2*d*e^3*x^2 + d^2*e^2)
```

3.232.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 140 vs. 2(62) = 124.

Time = 0.30 (sec) , antiderivative size = 140, normalized size of antiderivative = 2.06

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = -\frac{(2\,benx^2+bdn)\log(x)}{4\,(e^4x^4+2\,de^3x^2+d^2e^2)} - \frac{benx^2+4\,bex^2\log(c)+4\,aex^2+bdn+2\,bd\log(c)+2\,ad}{8\,(e^4x^4+2\,de^3x^2+d^2e^2)} - \frac{bn\log(ex^2+d)}{8\,de^2} + \frac{bn\log(x)}{4\,de^2}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
-1/4*(2*b*e*n*x^2 + b*d*n)*log(x)/(e^4*x^4 + 2*d*e^3*x^2 + d^2*e^2) - 1/8*
(b*e*n*x^2 + 4*b*e*x^2*log(c) + 4*a*e*x^2 + b*d*n + 2*b*d*log(c) + 2*a*d)/
(e^4*x^4 + 2*d*e^3*x^2 + d^2*e^2) - 1/8*b*n*log(e*x^2 + d)/(d*e^2) + 1/4*b
*n*log(x)/(d*e^2)
```

3.232.9 Mupad [B] (verification not implemented)

Time = 0.44 (sec) , antiderivative size = 129, normalized size of antiderivative = 1.90

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{b\,n\,\ln(x)}{4\,d\,e^2} - \frac{\ln(c\,x^n)\,\left(\frac{b\,x^2}{2\,e}+\frac{b\,d}{4\,e^2}\right)}{d^2+2\,d\,e\,x^2+e^2\,x^4} - \frac{b\,n\,\ln(e\,x^2+d)}{8\,d\,e^2} - \frac{\left(2\,a\,e+\frac{b\,e\,n}{2}\right)\,x^2+a\,d+\frac{b\,d\,n}{2}}{4\,d^2\,e^2+8\,d\,e^3\,x^2+4\,e^4\,x^4}$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
```

output
```
(b*n*log(x))/(4*d*e^2) - (log(c*x^n)*((b*x^2)/(2*e) + (b*d)/(4*e^2)))/(d^2
 + e^2*x^4 + 2*d*e*x^2) - (b*n*log(d + e*x^2))/(8*d*e^2) - (a*d + x^2*(2*a
*e + (b*e*n)/2) + (b*d*n)/2)/(4*d^2*e^2 + 4*e^4*x^4 + 8*d*e^3*x^2)
```

3.233 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

3.233.1 Optimal result

Integrand size = 21, antiderivative size = 82

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx=\frac{bn}{8de(d+ex^2)}+\frac{bn\log(x)}{4d^2e}-\frac{a+b\log(cx^n)}{4e(d+ex^2)^2}-\frac{bn\log(d+ex^2)}{8d^2e}$$

output
```
1/8*b*n/d/e/(e*x^2+d)+1/4*b*n*ln(x)/d^2/e+1/4*(-a-b*ln(c*x^n))/e/(e*x^2+d)
^2-1/8*b*n*ln(e*x^2+d)/d^2/e
```

3.233.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 111, normalized size of antiderivative = 1.35

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx=\frac{bn}{8de(d+ex^2)}+\frac{bn\log(x)}{4d^2e}-\frac{bn\log(x)}{4e(d+ex^2)^2}+\frac{-a-b(-n\log(x)+\log(cx^n))}{4e(d+ex^2)^2}-\frac{bn\log(d+ex^2)}{8d^2e}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
(b*n)/(8*d*e*(d + e*x^2)) + (b*n*Log[x])/(4*d^2*e) - (b*n*Log[x])/(4*e*(d
+ e*x^2)^2) + (-a - b*(-(n*Log[x]) + Log[c*x^n]))/(4*e*(d + e*x^2)^2) - (b
*n*Log[d + e*x^2])/(8*d^2*e)
```

3.233.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 71, normalized size of antiderivative = 0.87, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2776, 243, 54, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$

$$\Big\downarrow \text{ 2776}$$

$$\frac{bn\int \frac{1}{x(ex^2+d)^2}dx}{4e}-\frac{a+b\log(cx^n)}{4e(d+ex^2)^2}$$

$$\Big\downarrow \text{ 243}$$

$$\frac{bn\int \frac{1}{x^2(ex^2+d)^2}dx^2}{8e}-\frac{a+b\log(cx^n)}{4e(d+ex^2)^2}$$

$$\Big\downarrow \text{ 54}$$

$$\frac{bn\int \left(-\frac{e}{d^2(ex^2+d)}-\frac{e}{d(ex^2+d)^2}+\frac{1}{d^2x^2}\right)dx^2}{8e}-\frac{a+b\log(cx^n)}{4e(d+ex^2)^2}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{bn\left(-\frac{\log(d+ex^2)}{d^2}+\frac{\log(x^2)}{d^2}+\frac{1}{d(d+ex^2)}\right)}{8e}-\frac{a+b\log(cx^n)}{4e(d+ex^2)^2}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
-1/4*(a + b*Log[c*x^n])/(e*(d + e*x^2)^2) + (b*n*(1/(d*(d + e*x^2)) + Log[
x^2]/d^2 - Log[d + e*x^2]/d^2))/(8*e)
```

3.233.3.1 Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

3.233.4 Maple [A] (verified)

Time = 0.56 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.74

method	result
parallelrisch	$\frac{-\ln(e\,x^2+d)x^4 b\,e^3 n^2+2x^4\ln(c\,x^n)b\,e^3 n-2\ln(e\,x^2+d)x^2 bd\,e^2 n^2+4x^2\ln(c\,x^n)bd\,e^2 n+x^2 bd\,e^2 n^2-\ln(e\,x^2+d)b\,d^2 e\,n^2+b\,d^2 e\,\ldots}{8n\,d^2 e^2(e\,x^2+d)^2}$
risch	$-\frac{b\ln(x^n)}{4e(e\,x^2+d)^2}-\frac{\ln(e\,x^2+d)b\,e^2 n\,x^4-2\ln(x)b\,e^2 n\,x^4-i\pi b\,d^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)+i\pi b\,d^2\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2+i\ldots}{\ldots}$

input
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
1/8*(-ln(e*x^2+d)*x^4*b*e^3*n^2+2*x^4*ln(c*x^n)*b*e^3*n-2*ln(e*x^2+d)*x^2*
b*d*e^2*n^2+4*x^2*ln(c*x^n)*b*d*e^2*n+x^2*b*d*e^2*n^2-ln(e*x^2+d)*b*d^2*e*
n^2+b*d^2*e*n^2-2*a*d^2*e*n)/n/d^2/e^2/(e*x^2+d)^2
```

3.233.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.44

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{bdenx^2+bd^2n-2\,bd^2\log(c)-2\,ad^2-(be^2nx^4+2\,bdenx^2+bd^2n)\log(ex^2+d)+2\,(be^2nx^4+2\,bdenx^2)}{8\,(d^2e^3x^4+2\,d^3e^2x^2+d^4e)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
1/8*(b*d*e*n*x^2 + b*d^2*n - 2*b*d^2*log(c) - 2*a*d^2 - (b*e^2*n*x^4 + 2*b
*d*e*n*x^2 + b*d^2*n)*log(e*x^2 + d) + 2*(b*e^2*n*x^4 + 2*b*d*e*n*x^2)*log
(x))/(d^2*e^3*x^4 + 2*d^3*e^2*x^2 + d^4*e)
```

3.233.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 619 vs. $2(71) = 142$.

Time = 169.10 (sec) , antiderivative size = 619, normalized size of antiderivative = 7.55

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \begin{cases} \tilde{\infty}\left(-\frac{a}{4x^4}-\frac{bn}{16x^4}-\frac{b\log(cx^n)}{4x^4}\right) \\ \frac{\frac{ax^2}{2}-\frac{bnx^2}{4}+\frac{bx^2\log(cx^n)}{2}}{d^3} \\ \frac{-\frac{a}{4x^4}-\frac{bn}{16x^4}-\frac{b\log(cx^n)}{4x^4}}{e^3} \\ -\frac{2ad^2}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}-\frac{bd^2n\log\left(x-\sqrt{-\frac{d}{e}}\right)}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}-\frac{bd^2n\log\left(x+\sqrt{-\frac{d}{e}}\right)}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}+\frac{bd^2n}{8d^4e+16d^3e^2x^2+8d^2e^3x^4}-\frac{2bdenx^2\log\left(x\right.}{8d^4e+16d^3e^2x^2} \end{cases}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

output
```
Piecewise((zoo*(-a/(4*x**4) - b*n/(16*x**4) - b*log(c*x**n)/(4*x**4)), Eq(
d, 0) & Eq(e, 0)), ((a*x**2/2 - b*n*x**2/4 + b*x**2*log(c*x**n)/2)/d**3, E
q(e, 0)), ((-a/(4*x**4) - b*n/(16*x**4) - b*log(c*x**n)/(4*x**4))/e**3, Eq
(d, 0)), (-2*a*d**2/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d**2*e**3*x**4) - b*
d**2*n*log(x - sqrt(-d/e))/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d**2*e**3*x**
4) - b*d**2*n*log(x + sqrt(-d/e))/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d**2*e
**3*x**4) + b*d**2*n/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d**2*e**3*x**4) - 2
*b*d*e*n*x**2*log(x - sqrt(-d/e))/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d**2*e
**3*x**4) - 2*b*d*e*n*x**2*log(x + sqrt(-d/e))/(8*d**4*e + 16*d**3*e**2*x*
*2 + 8*d**2*e**3*x**4) + b*d*e*n*x**2/(8*d**4*e + 16*d**3*e**2*x**2 + 8*d*
*2*e**3*x**4) + 4*b*d*e*x**2*log(c*x**n)/(8*d**4*e + 16*d**3*e**2*x**2 + 8
*d**2*e**3*x**4) - b*e**2*n*x**4*log(x - sqrt(-d/e))/(8*d**4*e + 16*d**3*e
**2*x**2 + 8*d**2*e**3*x**4) - b*e**2*n*x**4*log(x + sqrt(-d/e))/(8*d**4*e
 + 16*d**3*e**2*x**2 + 8*d**2*e**3*x**4) + 2*b*e**2*x**4*log(c*x**n)/(8*d*
*4*e + 16*d**3*e**2*x**2 + 8*d**2*e**3*x**4), True))
```

3.233.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.33

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{1}{8}bn\left(\frac{1}{de^2x^2+d^2e}-\frac{\log(ex^2+d)}{d^2e}+\frac{\log(x^2)}{d^2e}\right) - \frac{b\log(cx^n)}{4(e^3x^4+2de^2x^2+d^2e)} - \frac{a}{4(e^3x^4+2de^2x^2+d^2e)}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
1/8*b*n*(1/(d*e^2*x^2 + d^2*e) - log(e*x^2 + d)/(d^2*e) + log(x^2)/(d^2*e)
) - 1/4*b*log(c*x^n)/(e^3*x^4 + 2*d*e^2*x^2 + d^2*e) - 1/4*a/(e^3*x^4 + 2*
d*e^2*x^2 + d^2*e)
```

3.233.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.41

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = -\frac{bdn\log(x)}{4\,(de^3x^4+2\,d^2e^2x^2+d^3e)} + \frac{benx^2+bdn-2\,bd\log(c)-2\,ad}{8\,(de^3x^4+2\,d^2e^2x^2+d^3e)} - \frac{bn\log(ex^2+d)}{8\,d^2e} + \frac{bn\log(x)}{4\,d^2e}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
-1/4*b*d*n*log(x)/(d*e^3*x^4 + 2*d^2*e^2*x^2 + d^3*e) + 1/8*(b*e*n*x^2 + b
*d*n - 2*b*d*log(c) - 2*a*d)/(d*e^3*x^4 + 2*d^2*e^2*x^2 + d^3*e) - 1/8*b*n
*log(e*x^2 + d)/(d^2*e) + 1/4*b*n*log(x)/(d^2*e)
```

3.233.9 Mupad [B] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.33

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{\frac{bn}{2}-a+\frac{b\,e\,n\,x^2}{2\,d}}{4\,d^2\,e+8\,d\,e^2\,x^2+4\,e^3\,x^4} - \frac{b\,\ln(c\,x^n)}{4\,e\,(d^2+2\,d\,e\,x^2+e^2\,x^4)} - \frac{b\,n\,\ln(e\,x^2+d)}{8\,d^2\,e} + \frac{b\,n\,\ln(x)}{4\,d^2\,e}$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
```

output
```
((b*n)/2 - a + (b*e*n*x^2)/(2*d))/(4*d^2*e + 4*e^3*x^4 + 8*d*e^2*x^2) - (b
*log(c*x^n))/(4*e*(d^2 + e^2*x^4 + 2*d*e*x^2)) - (b*n*log(d + e*x^2))/(8*d
^2*e) + (b*n*log(x))/(4*d^2*e)
```

3.234 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx$

3.234.1 Optimal result

Integrand size = 23, antiderivative size = 115

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx = \frac{a+b\log(cx^n)}{4d(d+ex^2)^2} - \frac{\log\left(1+\frac{d}{ex^2}\right)(4a-3bn+4b\log(cx^n))}{8d^3} + \frac{4a-bn+4b\log(cx^n)}{8d^2(d+ex^2)} + \frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^3}$$

output
```
1/4*(a+b*ln(c*x^n))/d/(e*x^2+d)^2-1/8*ln(1+d/e/x^2)*(4*a-3*b*n+4*b*ln(c*x^
n))/d^3+1/8*(4*a-b*n+4*b*ln(c*x^n))/d^2/(e*x^2+d)+1/4*b*n*polylog(2,-d/e/x
^2)/d^3
```

3.234.2 Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.61 (sec) , antiderivative size = 396, normalized size of antiderivative = 3.44

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx$$

$$= \frac{\frac{4d^2(a-bn\log(x)+b\log(cx^n))}{(d+ex^2)^2} + \frac{8d(a-bn\log(x)+b\log(cx^n))}{d+ex^2} + 16\log(x)(a-bn\log(x)+b\log(cx^n)) - 8(a-bn\log(x)}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)^3),x]
```

output
```
((4*d^2*(a - b*n*Log[x] + b*Log[c*x^n]))/(d + e*x^2)^2 + (8*d*(a - b*n*Log
[x] + b*Log[c*x^n]))/(d + e*x^2) + 16*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n
]) - 8*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d + e*x^2] - b*n*(d/(d - I*Sqrt
[d]*Sqrt[e]*x) + d/(d + I*Sqrt[d]*Sqrt[e]*x) + 2*Log[x] - (d*Log[x])/(Sqrt
[d] - I*Sqrt[e]*x)^2 - (d*Log[x])/(Sqrt[d] + I*Sqrt[e]*x)^2 + (5*Sqrt[e]*x
*Log[x])/((-I)*Sqrt[d] + Sqrt[e]*x) + (5*Sqrt[e]*x*Log[x])/(I*Sqrt[d] + Sq
rt[e]*x) - 8*Log[x]^2 - 6*Log[I*Sqrt[d] - Sqrt[e]*x] - 6*Log[I*Sqrt[d] + S
qrt[e]*x] + 8*Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 8*Log[x]*Log[1 + (I*
Sqrt[e]*x)/Sqrt[d]] + 8*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] + 8*PolyLog[2
, (I*Sqrt[e]*x)/Sqrt[d]]))/(16*d^3)
```

3.234.3 Rubi [A] (verified)

Time = 0.49 (sec) , antiderivative size = 125, normalized size of antiderivative = 1.09, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2785, 25, 2785, 27, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}dx$$

$$\Big\downarrow \text{2785}$$

$$\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}-\frac{\int -\frac{4a-bn+4b\log(cx^n)}{x(ex^2+d)^2}dx}{4d}$$

$$\Big\downarrow \text{25}$$

$$\frac{\int \frac{4a-bn+4b\log(cx^n)}{x(ex^2+d)^2}dx}{4d}+\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}$$

$$\Big\downarrow \text{2785}$$

$$\frac{\frac{4a+4b\log(cx^n)-bn}{2d(d+ex^2)}-\frac{\int -\frac{2(4a-3bn+4b\log(cx^n))}{x(ex^2+d)}dx}{2d}}{4d}+\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{\frac{\int \frac{4a-3bn+4b\log(cx^n)}{x(ex^2+d)}dx}{d}+\frac{4a+4b\log(cx^n)-bn}{2d(d+ex^2)}}{4d}+\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}$$

$$\Big\downarrow \text{2779}$$

$$\frac{\frac{\frac{2bn\int \frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(4a+4b\log(cx^n)-3bn)}{2d}}{d}+\frac{4a+4b\log(cx^n)-bn}{2d(d+ex^2)}}{4d}+\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(4a+4b\log(cx^n)-3bn)}{2d}}{d}+\frac{4a+4b\log(cx^n)-bn}{2d(d+ex^2)}}{4d}+\frac{a+b\log(cx^n)}{4d(d+ex^2)^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)^3),x]
```

output
```
(a + b*Log[c*x^n])/(4*d*(d + e*x^2)^2) + ((4*a - b*n + 4*b*Log[c*x^n])/(2*
d*(d + e*x^2)) + (-1/2*(Log[1 + d/(e*x^2)]*(4*a - 3*b*n + 4*b*Log[c*x^n]))
/d + (b*n*PolyLog[2, -(d/(e*x^2))])/d)/d)/(4*d)
```

3.234.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.234.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.07 (sec) , antiderivative size = 390, normalized size of antiderivative = 3.39

method	result
risch	$-\frac{b\ln(x^n)\ln(e\,x^2+d)}{2d^3}+\frac{b\ln(x^n)}{2d^2(e\,x^2+d)}+\frac{b\ln(x^n)}{4d(e\,x^2+d)^2}+\frac{b\ln(x^n)\ln(x)}{d^3}-\frac{bn\ln(x)^2}{2d^3}+\frac{bn\ln(x)\ln(e\,x^2+d)}{2d^3}-\frac{bn\ln(x)\ln\left(\frac{-e}{}\right.}{2d^3}$

input
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*ln(x^n)/d^3*ln(e*x^2+d)+1/2*b*ln(x^n)/d^2/(e*x^2+d)+1/4*b*ln(x^n)/d
/(e*x^2+d)^2+b*ln(x^n)/d^3*ln(x)-1/2*b*n/d^3*ln(x)^2+1/2*b*n/d^3*ln(x)*ln(
e*x^2+d)-1/2*b*n/d^3*ln(x)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/d^
3*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/d^3*dilog((-e*x+(-d*e)
^(1/2))/(-d*e)^(1/2))-1/2*b*n/d^3*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+3
/8*b*n/d^3*ln(e*x^2+d)-1/8*b*n/d^2/(e*x^2+d)-3/4*b*n*ln(x)/d^3+(-1/2*I*b*P
i*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2
+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)
+a)*(-1/2*e/d^3*(1/e*ln(e*x^2+d)-d/e/(e*x^2+d)-1/2*d^2/e/(e*x^2+d)^2)+1/d^
3*ln(x))
```

3.234.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^3}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^7 + 3*d*e^2*x^5 + 3*d^2*e*x^3 + d^3*x),
 x)
```

3.234.6 Sympy [A] (verification not implemented)

Time = 119.75 (sec) , antiderivative size = 403, normalized size of antiderivative = 3.50

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx = -\frac{ae\left(\begin{cases}\frac{x^2}{2d^3} & \text{for } e=0\\ -\frac{1}{4e(d+ex^2)^2} & \text{otherwise}\end{cases}\right)}{d} - \frac{ae\left(\begin{cases}\frac{x^2}{2d^2} & \text{for } e=0\\ -\frac{1}{2de+2e^2x^2} & \text{otherwise}\end{cases}\right)}{d^2}$$

$$+\frac{a\log(x)}{d^3} - \frac{a\log(d+ex^2)}{2d^3} + \frac{be^2n\left(\begin{cases}-\frac{1}{2e^3x^2} & \text{for } d=0\\ -\frac{1}{4de^2+4e^3x^2}-\frac{\log(d+ex^2)}{4de^2} & \text{otherwise}\end{cases}\right)}{2d^2}$$

$$-\frac{be^2\left(\begin{cases}\frac{1}{e^3x^2} & \text{for } d=0\\ -\frac{1}{2d\left(\frac{d}{x^2}+e\right)^2} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2d^2}$$

$$-\frac{ben\left(\begin{cases}-\frac{1}{2e^2x^2} & \text{for } d=0\\ -\frac{\log(d+ex^2)}{2de} & \text{otherwise}\end{cases}\right)}{d^2} + \frac{be\left(\begin{cases}\frac{1}{e^2x^2} & \text{for } d=0\\ -\frac{1}{\frac{d^2}{x^2}+de} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2}$$

$$+\frac{bn\left(\begin{cases}-\frac{1}{2ex^2} & \text{fo}\\ \frac{\begin{cases}\frac{\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(e)\log(x)+\frac{\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)+\frac{\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)+\frac{\mathrm{Li}_2\left(\frac{de^{i\pi}}{ex^2}\right)}{2} & \text{otherwise}\end{cases}}{d} & \text{ot}\end{cases}\right)}{2d^2}$$

$$-\frac{b\left(\begin{cases}\frac{1}{ex^2} & \text{for } d=0\\ \frac{\log\left(\frac{d}{x^2}+e\right)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{2d^2}$$

input

```
integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**3,x)
```

output
```
-a*e*Piecewise((x**2/(2*d**3), Eq(e, 0)), (-1/(4*e*(d + e*x**2)**2), True)
)/d - a*e*Piecewise((x**2/(2*d**2), Eq(e, 0)), (-1/(2*d*e + 2*e**2*x**2),
True))/d**2 + a*log(x)/d**3 - a*log(d + e*x**2)/(2*d**3) + b*e**2*n*Piecew
ise((-1/(2*e**3*x**2), Eq(d, 0)), (-1/(4*d*e**2 + 4*e**3*x**2) - log(d + e
*x**2)/(4*d*e**2), True))/(2*d**2) - b*e**2*Piecewise((1/(e**3*x**2), Eq(d
, 0)), (-1/(2*d*(d/x**2 + e)**2), True))*log(c*x**n)/(2*d**2) - b*e*n*Piec
ewise((-1/(2*e**2*x**2), Eq(d, 0)), (-log(d + e*x**2)/(2*d*e), True))/d**2
 + b*e*Piecewise((1/(e**2*x**2), Eq(d, 0)), (-1/(d**2/x**2 + d*e), True))*
log(c*x**n)/d**2 + b*n*Piecewise((-1/(2*e*x**2), Eq(d, 0)), (Piecewise((po
lylog(2, d*exp_polar(I*pi)/(e*x**2))/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (l
og(e)*log(x) + polylog(2, d*exp_polar(I*pi)/(e*x**2))/2, Abs(x) < 1), (-lo
g(e)*log(1/x) + polylog(2, d*exp_polar(I*pi)/(e*x**2))/2, 1/Abs(x) < 1), (
-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), (()
, (0, 0)), x)*log(e) + polylog(2, d*exp_polar(I*pi)/(e*x**2))/2, True))/d,
 True))/(2*d**2) - b*Piecewise((1/(e*x**2), Eq(d, 0)), (log(d/x**2 + e)/d,
 True))*log(c*x**n)/(2*d**2)
```

3.234.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
1/4*a*((2*e*x^2 + 3*d)/(d^2*e^2*x^4 + 2*d^3*e*x^2 + d^4) - 2*log(e*x^2 + d
)/d^3 + 4*log(x)/d^3) + b*integrate((log(c) + log(x^n))/(e^3*x^7 + 3*d*e^2
*x^5 + 3*d^2*e*x^3 + d^3*x), x)
```

3.234.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^3}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^3*x), x)
```

3.234.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^3}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(e\,x^2+d\right)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^3), x)
```

3.235 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx$

3.235.1 Optimal result

Integrand size = 23, antiderivative size = 162

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx = -\frac{3bn}{4d^3x^2}+\frac{a+b\log(cx^n)}{4dx^2(d+ex^2)^2}+\frac{6a-bn+6b\log(cx^n)}{8d^2x^2(d+ex^2)} - \frac{12a-5bn+12b\log(cx^n)}{8d^3x^2} + \frac{e\log\left(1+\frac{d}{ex^2}\right)(12a-5bn+12b\log(cx^n))}{8d^4} - \frac{3ben\operatorname{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{4d^4}$$

output
```
-3/4*b*n/d^3/x^2+1/4*(a+b*ln(c*x^n))/d/x^2/(e*x^2+d)^2+1/8*(6*a-b*n+6*b*ln
(c*x^n))/d^2/x^2/(e*x^2+d)+1/8*(-12*a+5*b*n-12*b*ln(c*x^n))/d^3/x^2+1/8*e*
ln(1+d/e/x^2)*(12*a-5*b*n+12*b*ln(c*x^n))/d^4-3/4*b*e*n*polylog(2,-d/e/x^2
)/d^4
```

3.235.2 Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.73 (sec) , antiderivative size = 507, normalized size of antiderivative = 3.13

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx$$

$$= \frac{-\frac{8d(a-bn\log(x)+b\log(cx^n))}{x^2}-\frac{4d^2e(a-bn\log(x)+b\log(cx^n))}{(d+ex^2)^2}-\frac{16de(a-bn\log(x)+b\log(cx^n))}{d+ex^2}-48e\log(x)\,(a-bn\log(x)+b}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^3),x]
```

output
```
((-8*d*(a - b*n*Log[x] + b*Log[c*x^n]))/x^2 - (4*d^2*e*(a - b*n*Log[x] + b
*Log[c*x^n]))/(d + e*x^2)^2 - (16*d*e*(a - b*n*Log[x] + b*Log[c*x^n]))/(d
+ e*x^2) - 48*e*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n]) + 24*e*(a - b*n*Log
[x] + b*Log[c*x^n])*Log[d + e*x^2] + b*n*((9*e^(3/2)*x*Log[x])/((-I)*Sqrt[
d] + Sqrt[e]*x) - 24*e*Log[x]^2 - (4*d*(1 + 2*Log[x]))/x^2 + e*(d/(d + I*S
qrt[d]*Sqrt[e]*x) + Log[x] - (d*Log[x])/(Sqrt[d] + I*Sqrt[e]*x)^2 - Log[I*
Sqrt[d] - Sqrt[e]*x]) - 9*e*Log[I*Sqrt[d] - Sqrt[e]*x] + e*(d/(d - I*Sqrt[
d]*Sqrt[e]*x) + Log[x] - (d*Log[x])/(Sqrt[d] - I*Sqrt[e]*x)^2 - Log[I*Sqrt
[d] + Sqrt[e]*x]) + ((-9*I)*e^(3/2)*x*Log[x] + (9*I)*e*(I*Sqrt[d] + Sqrt[e
]*x)*Log[I*Sqrt[d] + Sqrt[e]*x])/(Sqrt[d] - I*Sqrt[e]*x) + 24*e*(Log[x]*Lo
g[1 + (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]]) + 24*
e*(Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d
]])))/(16*d^4)
```

3.235.3 Rubi [A] (verified)

Time = 0.76 (sec) , antiderivative size = 175, normalized size of antiderivative = 1.08, number of steps used = 8, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.348$, Rules used = {2785, 25, 2785, 27, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx$$

$$\Big\downarrow \; 2785$$

$$\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}-\frac{\int -\frac{6a-bn+6b\log(cx^n)}{x^3(ex^2+d)^2}dx}{4d}$$

$$\Big\downarrow \ 25$$

$$\frac{\int \frac{6a-bn+6b\log(cx^n)}{x^3(ex^2+d)^2}dx}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}$$

$$\Big\downarrow \ 2785$$

$$\frac{\frac{6a+6b\log(cx^n)-bn}{2dx^2(d+ex^2)}-\frac{\int -\frac{2(12a-5bn+12b\log(cx^n))}{x^3\left(ex^2+d\right)}dx}{2d}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}$$

$$\Big\downarrow \ 27$$

$$\frac{\frac{\int \frac{12a-5bn+12b\log(cx^n)}{x^3\left(ex^2+d\right)}dx}{d}+\frac{6a+6b\log(cx^n)-bn}{2dx^2(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}$$

$$\Big\downarrow \ 2780$$

$$\frac{\frac{\frac{\int \frac{12a-5bn+12b\log(cx^n)}{x^3}dx}{d}-\frac{e\int \frac{12a-5bn+12b\log(cx^n)}{x\left(ex^2+d\right)}dx}{d}}{d}+\frac{6a+6b\log(cx^n)-bn}{2dx^2(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}$$

$$\Big\downarrow \ 2741$$

$$\frac{\frac{\frac{-\frac{12a+12b\log(cx^n)-5bn}{2x^2}-\frac{3bn}{x^2}}{d}-\frac{e\int \frac{12a-5bn+12b\log(cx^n)}{x\left(ex^2+d\right)}dx}{d}}{d}+\frac{6a+6b\log(cx^n)-bn}{2dx^2(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}$$

$$\Big\downarrow \ 2779$$

$$\frac{\frac{\frac{-\frac{12a+12b\log(cx^n)-5bn}{2x^2}-\frac{3bn}{x^2}}{d}-\frac{e\left(\frac{6bn\int \frac{\log\left(\frac{d}{ex^2}+1\right)}{x}dx}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(12a+12b\log(cx^n)-5bn)}{2d}\right)}{d}}{d}+\frac{6a+6b\log(cx^n)-bn}{2dx^2(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^2\left(d+ex^2\right)^2}$$

$$\Big\downarrow \ 2838$$

3.235. $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx$

$$\frac{\frac{\frac{-\frac{12a+12b\log(cx^n)-5bn}{2x^2}-\frac{3bn}{x^2}}{d}-\frac{e\left(\frac{3bn\,\mathrm{PolyLog}\left(2,-\frac{d}{ex^2}\right)}{d}-\frac{\log\left(\frac{d}{ex^2}+1\right)(12a+12b\log(cx^n)-5bn)}{2d}\right)}{d}}{d}+\frac{6a+6b\log(cx^n)-bn}{2dx^2(d+ex^2)}}{4d}+\frac{a+b\log(cx^n)}{4dx^2(d+ex^2)^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^3),x]
```

output
```
(a + b*Log[c*x^n])/(4*d*x^2*(d + e*x^2)^2) + ((6*a - b*n + 6*b*Log[c*x^n])
/(2*d*x^2*(d + e*x^2)) + (((-3*b*n)/x^2 - (12*a - 5*b*n + 12*b*Log[c*x^n])
/(2*x^2))/d - (e*(-1/2*(Log[1 + d/(e*x^2)]*(12*a - 5*b*n + 12*b*Log[c*x^n]
))/d + (3*b*n*PolyLog[2, -(d/(e*x^2))])/d))/d)/d)/(4*d)
```

3.235.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

3.235. $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx$

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.235.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.18 (sec) , antiderivative size = 440, normalized size of antiderivative = 2.72

method	result
risch	$-\frac{b\ln(x^n)e}{4d^2(e\,x^2+d)^2}+\frac{3b\ln(x^n)e\ln(e\,x^2+d)}{2d^4}-\frac{b\ln(x^n)e}{d^3(e\,x^2+d)}-\frac{b\ln(x^n)}{2d^3x^2}-\frac{3b\ln(x^n)e\ln(x)}{d^4}+\frac{3bne\ln(x)^2}{2d^4}-\frac{3bne\ln(x)\ln(e\,x^2+}{2d^4}$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-1/4*b*ln(x^n)*e/d^2/(e*x^2+d)^2+3/2*b*ln(x^n)*e/d^4*ln(e*x^2+d)-b*ln(x^n)
*e/d^3/(e*x^2+d)-1/2*b*ln(x^n)/d^3/x^2-3*b*ln(x^n)/d^4*e*ln(x)+3/2*b*n/d^4
*e*ln(x)^2-3/2*b*n/d^4*e*ln(x)*ln(e*x^2+d)+3/2*b*n/d^4*e*ln(x)*ln((-e*x+(-
d*e)^(1/2))/(-d*e)^(1/2))+3/2*b*n/d^4*e*ln(x)*ln((e*x+(-d*e)^(1/2))/(-d*e)
^(1/2))+3/2*b*n/d^4*e*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+3/2*b*n/d^4*
e*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-5/8*b*n*e/d^4*ln(e*x^2+d)+1/8*b*n
*e/d^3/(e*x^2+d)-1/4*b*n/d^3/x^2+5/4*b*e*n*ln(x)/d^4+(-1/2*I*b*Pi*csgn(I*c
)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*P
i*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/2*e
^2/d^4*(-1/2*d^2/e/(e*x^2+d)^2+3/e*ln(e*x^2+d)-2*d/e/(e*x^2+d))-1/2/d^3/x^
2-3/d^4*e*ln(x))
```

3.235.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)^3}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^3x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^9 + 3*d*e^2*x^7 + 3*d^2*e*x^5 + d^3*x^3
), x)
```

3.235.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)^3}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**3,x)
```

output
```
Timed out
```

3.235.7 Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)^3}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^3x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
-1/4*a*((6*e^2*x^4 + 9*d*e*x^2 + 2*d^2)/(d^3*e^2*x^6 + 2*d^4*e*x^4 + d^5*x
^2) - 6*e*log(e*x^2 + d)/d^4 + 12*e*log(x)/d^4) + b*integrate((log(c) + lo
g(x^n))/(e^3*x^9 + 3*d*e^2*x^7 + 3*d^2*e*x^5 + d^3*x^3), x)
```

3.235.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)^3x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^3*x^3), x)
```

3.235.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^3}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x^3\,(e\,x^2+d)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^3), x)
```

3.236 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

3.236.1 Optimal result

Integrand size = 23, antiderivative size = 211

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = -\frac{bnx}{8e^2(d+ex^2)}+\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2\sqrt{d}e^{5/2}}+\frac{dx(a+b\log(cx^n))}{4e^2(d+ex^2)^2}-\frac{5x(a+b\log(cx^n))}{8e^2(d+ex^2)}+\frac{3\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8\sqrt{d}e^{5/2}}-\frac{3ibn\operatorname{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16\sqrt{d}e^{5/2}}+\frac{3ibn\operatorname{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16\sqrt{d}e^{5/2}}$$

output
```
-1/8*b*n*x/e^2/(e*x^2+d)+1/4*d*x*(a+b*ln(c*x^n))/e^2/(e*x^2+d)^2-5/8*x*(a+
b*ln(c*x^n))/e^2/(e*x^2+d)+1/2*b*n*arctan(x*e^(1/2)/d^(1/2))/e^(5/2)/d^(1/
2)+3/8*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/e^(5/2)/d^(1/2)-3/16*I*b*
n*polylog(2,-I*x*e^(1/2)/d^(1/2))/e^(5/2)/d^(1/2)+3/16*I*b*n*polylog(2,I*x
*e^(1/2)/d^(1/2))/e^(5/2)/d^(1/2)
```

3.236.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 495 vs. 2(211) = 422.

Time = 0.77 (sec) , antiderivative size = 495, normalized size of antiderivative = 2.35

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$

$$= \frac{-\frac{\sqrt{-d}(a+b\log(cx^n))}{(\sqrt{-d}-\sqrt{e}x)^2}+\frac{5(a+b\log(cx^n))}{\sqrt{-d}-\sqrt{e}x}+\frac{\sqrt{-d}(a+b\log(cx^n))}{(\sqrt{-d}+\sqrt{e}x)^2}-\frac{5(a+b\log(cx^n))}{\sqrt{-d}+\sqrt{e}x}-\frac{5bn(\log(x)-\log(\sqrt{-d}-\sqrt{e}x))}{\sqrt{-d}}+\frac{5bn(\log(x)-\log}{\sqrt{-}}}{}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
(-((Sqrt[-d]*(a + b*Log[c*x^n]))/(Sqrt[-d] - Sqrt[e]*x)^2) + (5*(a + b*Log
[c*x^n]))/(Sqrt[-d] - Sqrt[e]*x) + (Sqrt[-d]*(a + b*Log[c*x^n]))/(Sqrt[-d]
 + Sqrt[e]*x)^2 - (5*(a + b*Log[c*x^n]))/(Sqrt[-d] + Sqrt[e]*x) - (5*b*n*(
Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/Sqrt[-d] + (5*b*n*(Log[x] - Log[Sqrt[
-d] + Sqrt[e]*x]))/Sqrt[-d] - (b*n*(d + (d - Sqrt[-d]*Sqrt[e]*x)*Log[x] +
(-d + Sqrt[-d]*Sqrt[e]*x)*Log[Sqrt[-d] + Sqrt[e]*x]))/(d*(Sqrt[-d] + Sqrt[
e]*x)) - (3*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/Sqrt[-d] + (
b*n*(d + (d + Sqrt[-d]*Sqrt[e]*x)*Log[x] - (d + Sqrt[-d]*Sqrt[e]*x)*Log[(-
d)^(3/2) + d*Sqrt[e]*x]))/(d*(Sqrt[-d] - Sqrt[e]*x)) + (3*(a + b*Log[c*x^n
])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/Sqrt[-d] + (3*b*n*PolyLog[2, (Sqrt[e
]*x)/Sqrt[-d]])/Sqrt[-d] - (3*b*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/Sq
rt[-d])/(16*e^(5/2))
```

3.236.3 Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))}{e^2(d+ex^2)^3}-\frac{2d(a+b\log(cx^n))}{e^2(d+ex^2)^2}+\frac{a+b\log(cx^n)}{e^2(d+ex^2)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{3\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8\sqrt{d}e^{5/2}}-\frac{5x(a+b\log(cx^n))}{8e^2(d+ex^2)}+\frac{dx(a+b\log(cx^n))}{4e^2(d+ex^2)^2}+\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2\sqrt{d}e^{5/2}}-\frac{3ibn\operatorname{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16\sqrt{d}e^{5/2}}+\frac{3ibn\operatorname{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16\sqrt{d}e^{5/2}}-\frac{bnx}{8e^2(d+ex^2)}$$

input
```
Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
-1/8*(b*n*x)/(e^2*(d + e*x^2)) + (b*n*ArcTan[(Sqrt[e]*x)/Sqrt[d]])/(2*Sqrt
[d]*e^(5/2)) + (d*x*(a + b*Log[c*x^n]))/(4*e^2*(d + e*x^2)^2) - (5*x*(a +
b*Log[c*x^n]))/(8*e^2*(d + e*x^2)) + (3*ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b
*Log[c*x^n]))/(8*Sqrt[d]*e^(5/2)) - (((3*I)/16)*b*n*PolyLog[2, ((-I)*Sqrt[
e]*x)/Sqrt[d]])/(Sqrt[d]*e^(5/2)) + (((3*I)/16)*b*n*PolyLog[2, (I*Sqrt[e]*
x)/Sqrt[d]])/(Sqrt[d]*e^(5/2))
```

3.236.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.236.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.69 (sec) , antiderivative size = 900, normalized size of antiderivative = 4.27

method	result	size
risch	Expression too large to display	900

input
```
int(x^4*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
3/8*b*n*d/e*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(
1/2))*x^2-3/8*b*n*d/e*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))
/(-d*e)^(1/2))*x^2+1/2*b*n/e^2*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(
-d*e)^(1/2))-1/2*b*n/e^2*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(
1/2))+b*n/e*ln(x)/(e*x^2+d)^2*x^3+3/16*b*n*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*
ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^4-b*n/e^2*ln(x)*x/(e*x^2+d)-3/16*b*
n*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^4+b
*n*d/e^2*ln(x)/(e*x^2+d)^2*x-3/8*b/e^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))
*n*ln(x)-3/8*b*ln(x^n)*d/e^2/(e*x^2+d)^2*x+3/16*b*n*d^2/e^2*ln(x)/(e*x^2+d
)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+3/16*b*n/e^2/(-d*e)^
(1/2)*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-3/16*b*n/e^2/(-d*e)^(1/2)*di
log((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/8*b*n*x/e^2/(e*x^2+d)+1/2*b*n/e^2/(
d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))-5/8*b/(e*x^2+d)^2/e*x^3*ln(x^n)+3/8*b/e
^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)-3/16*b*n*d^2/e^2*ln(x)/(e*x
^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/2*b*n/e*ln(x)/(
e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2+1/2*b*n/e*l
n(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2-1/2*b*
n*d/e^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+
1/2*b*n*d/e^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1
/2))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I...
```

3.236.5 Fricas [F]

$$\int \frac{x^4(a+b\log{(cx^n)})}{(d+ex^2)^3}\,dx = \int \frac{(b\log{(cx^n)}+a)x^4}{(ex^2+d)^3}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*x^4*log(c*x^n) + a*x^4)/(e^3*x^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 +
 d^3), x)
```

3.236.6 Sympy [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$

input
```
integrate(x**4*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

output
```
Integral(x**4*(a + b*log(c*x**n))/(d + e*x**2)**3, x)
```

3.236.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.236.8 Giac [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{(ex^2+d)^3}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^4/(e*x^2 + d)^3, x)
```

3.236.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{x^4\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^3}\,dx$$

input
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
```

output
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^3, x)
```

3.237 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$

3.237.1 Optimal result

Integrand size = 23, antiderivative size = 187

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \frac{bnx}{8de(d+ex^2)} - \frac{x(a+b\log(cx^n))}{4e(d+ex^2)^2} + \frac{x(a+b\log(cx^n))}{8de(d+ex^2)} + \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8d^{3/2}e^{3/2}} - \frac{ibn\,\mathrm{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16d^{3/2}e^{3/2}} + \frac{ibn\,\mathrm{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16d^{3/2}e^{3/2}}$$

output
```
1/8*b*n*x/d/e/(e*x^2+d)-1/4*x*(a+b*ln(c*x^n))/e/(e*x^2+d)^2+1/8*x*(a+b*ln(
c*x^n))/d/e/(e*x^2+d)+1/8*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(3/2
)/e^(3/2)-1/16*I*b*n*polylog(2,-I*x*e^(1/2)/d^(1/2))/d^(3/2)/e^(3/2)+1/16*
I*b*n*polylog(2,I*x*e^(1/2)/d^(1/2))/d^(3/2)/e^(3/2)
```

3.237.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 497 vs. $2(187) = 374$.

Time = 0.61 (sec) , antiderivative size = 497, normalized size of antiderivative = 2.66

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$

$$= \frac{\frac{d(a+b\log(cx^n))}{(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}x\right)^2} + \frac{a+b\log(cx^n)}{\sqrt{-d}\left(\sqrt{-d}+\sqrt{e}x\right)^2} - \frac{a+b\log(cx^n)}{\sqrt{-d}d-d\sqrt{e}x} + \frac{a+b\log(cx^n)}{\sqrt{-d}d+d\sqrt{e}x} + \frac{bdn\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}x\right)\right)}{(-d)^{5/2}} + \frac{bn\left(\log(x)-\log\left(\sqrt{-d}-\right.\right.}{(-d)^{3/2}}}{}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
((d*(a + b*Log[c*x^n]))/((-d)^(3/2)*(Sqrt[-d] - Sqrt[e]*x)^2) + (a + b*Log
[c*x^n])/(Sqrt[-d]*(Sqrt[-d] + Sqrt[e]*x)^2) - (a + b*Log[c*x^n])/(Sqrt[-d
]*d - d*Sqrt[e]*x) + (a + b*Log[c*x^n])/(Sqrt[-d]*d + d*Sqrt[e]*x) + (b*d*
n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/(-d)^(5/2) + (b*n*(Log[x] - Log[Sq
rt[-d] + Sqrt[e]*x]))/(-d)^(3/2) + (b*n*(d + (d - Sqrt[-d]*Sqrt[e]*x)*Log[
x] + (-d + Sqrt[-d]*Sqrt[e]*x)*Log[Sqrt[-d] + Sqrt[e]*x]))/(d^2*(Sqrt[-d]
+ Sqrt[e]*x)) + ((a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3
/2) - (b*n*(d + (d + Sqrt[-d]*Sqrt[e]*x)*Log[x] - (d + Sqrt[-d]*Sqrt[e]*x)
*Log[(-d)^(3/2) + d*Sqrt[e]*x]))/(d^2*(Sqrt[-d] - Sqrt[e]*x)) + (d*(a + b*
Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(5/2) + (b*d*n*PolyLog
[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(5/2) + (b*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)
^(3/2)])/(-d)^(3/2))/(16*e^(3/2))
```

3.237.3 Rubi [A] (verified)

Time = 0.51 (sec) , antiderivative size = 187, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}dx$$

$$\Big\downarrow \ 2793$$

$$\int \left(\frac{a+b\log(cx^n)}{e(d+ex^2)^2}-\frac{d(a+b\log(cx^n))}{e(d+ex^2)^3}\right)dx$$

$$\Big\downarrow \ 2009$$

$$\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8d^{3/2}e^{3/2}}+\frac{x(a+b\log(cx^n))}{8de(d+ex^2)}-\frac{x(a+b\log(cx^n))}{4e(d+ex^2)^2}-\frac{ibn\operatorname{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16d^{3/2}e^{3/2}}+\frac{ibn\operatorname{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16d^{3/2}e^{3/2}}+\frac{bnx}{8de(d+ex^2)}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^3,x]
```

output
```
(b*n*x)/(8*d*e*(d + e*x^2)) - (x*(a + b*Log[c*x^n]))/(4*e*(d + e*x^2)^2) +
 (x*(a + b*Log[c*x^n]))/(8*d*e*(d + e*x^2)) + (ArcTan[(Sqrt[e]*x)/Sqrt[d]]
*(a + b*Log[c*x^n]))/(8*d^(3/2)*e^(3/2)) - ((I/16)*b*n*PolyLog[2, ((-I)*Sq
rt[e]*x)/Sqrt[d]])/(d^(3/2)*e^(3/2)) + ((I/16)*b*n*PolyLog[2, (I*Sqrt[e]*x
)/Sqrt[d]])/(d^(3/2)*e^(3/2))
```

3.237.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.237.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.65 (sec) , antiderivative size = 826, normalized size of antiderivative = 4.42

method	result
risch	$-\frac{bn\ln(x)x^3}{2d(ex^2+d)^2}+\frac{bx^3\ln(x^n)}{8(ex^2+d)^2d}-\frac{bn\ln(x)x}{2e(ex^2+d)^2}-\frac{bx\ln(x^n)}{8(ex^2+d)^2e}-\frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{8ed\sqrt{de}}+\frac{b\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{8ed\sqrt{de}}+\frac{bnx}{8de(ex^2}$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-1/2*b*n/d*ln(x)/(e*x^2+d)^2*x^3+1/8*b/(e*x^2+d)^2/d*x^3*ln(x^n)-1/2*b*n/e
*ln(x)/(e*x^2+d)^2*x-1/8*b/(e*x^2+d)^2*x/e*ln(x^n)-1/8*b/e/d/(d*e)^(1/2)*a
rctan(x*e/(d*e)^(1/2))*n*ln(x)+1/8*b/e/d/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2
))*ln(x^n)+1/8*b*n*x/d/e/(e*x^2+d)-3/16*b*n/d*e*ln(x)/(e*x^2+d)^2/(-d*e)^(
1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^4+3/16*b*n/d*e*ln(x)/(e*x^2+d)
^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^4-3/8*b*n*ln(x)/(e*x
^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2+3/8*b*n*ln(x
)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2-3/16*b*
n*d/e*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+
3/16*b*n*d/e*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(
1/2))+1/16*b*n/d/e/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/
16*b*n/d/e/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+1/4*b*n*ln(
x)/d/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2-1/4*b
*n*ln(x)/d/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2+
1/2*b*n/e*ln(x)/d/(e*x^2+d)*x+1/4*b*n/e*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-
e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-1/4*b*n/e*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln(
(e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I
*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I
*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*((1/8/d*x^3-1/8*x/e)/(e*x^
2+d)^2+1/8/e/d/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2)))
```

3.237.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^2+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e^3*x^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 +
 d^3), x)
```

3.237.6 Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2)**3, x)
```

3.237.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.237.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^2+d)^3}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^2 + d)^3, x)
```

3.237.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^3}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^3}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^3,x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^3, x)
```

3.238 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx$

3.238.1 Optimal result

Integrand size = 20, antiderivative size = 210

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx = -\frac{bnx}{8d^2(d+ex^2)} - \frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{5/2}\sqrt{e}} + \frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2} + \frac{3x(a+b\log(cx^n))}{8d^2(d+ex^2)} + \frac{3\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8d^{5/2}\sqrt{e}} - \frac{3ibn\,\mathrm{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16d^{5/2}\sqrt{e}} + \frac{3ibn\,\mathrm{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16d^{5/2}\sqrt{e}}$$

output
```
-1/8*b*n*x/d^2/(e*x^2+d)+1/4*x*(a+b*ln(c*x^n))/d/(e*x^2+d)^2+3/8*x*(a+b*ln
(c*x^n))/d^2/(e*x^2+d)-1/2*b*n*arctan(x*e^(1/2)/d^(1/2))/d^(5/2)/e^(1/2)+3
/8*arctan(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))/d^(5/2)/e^(1/2)-3/16*I*b*n*po
lylog(2,-I*x*e^(1/2)/d^(1/2))/d^(5/2)/e^(1/2)+3/16*I*b*n*polylog(2,I*x*e^(
1/2)/d^(1/2))/d^(5/2)/e^(1/2)
```

3.238.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 544 vs. 2(210) = 420.

Time = 0.59 (sec) , antiderivative size = 544, normalized size of antiderivative = 2.59

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx$$
$$= \frac{1}{16}\left(\frac{d(a+b\log(cx^n))}{(-d)^{5/2}\sqrt{e}\left(\sqrt{-d}-\sqrt{e}x\right)^2}+\frac{a+b\log(cx^n)}{(-d)^{3/2}\sqrt{e}\left(\sqrt{-d}+\sqrt{e}x\right)^2}+\frac{3(a+b\log(cx^n))}{(-d)^{5/2}\sqrt{e}+d^2ex}+\frac{3(a+b\log(cx^n))}{(-d)^{3/2}d\sqrt{e}+d^2ex}+\frac{3bn\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}x\right)\right)}{(-d)^{5/2}\sqrt{e}}-\frac{3bn\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{(-d)^{5/2}\sqrt{e}}-\frac{bn\left(d+\left(d-\sqrt{-d}\sqrt{e}x\right)\log(x)+\left(-d+\sqrt{-d}\sqrt{e}x\right)\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{d^3\left(\sqrt{-d}\sqrt{e}+ex\right)}-\frac{3(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}\sqrt{e}}-\frac{bn\left(d+\left(d+\sqrt{-d}\sqrt{e}x\right)\log(x)-\left(d+\sqrt{-d}\sqrt{e}x\right)\log\left((-d)^{3/2}+d\sqrt{e}x\right)\right)}{(-d)^{7/2}\sqrt{e}+d^3ex}+\frac{3(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}\sqrt{e}}+\frac{3bn\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{5/2}\sqrt{e}}-\frac{3bn\operatorname{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{5/2}\sqrt{e}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^2)^3,x]
```

output
```
((d*(a + b*Log[c*x^n]))/((-d)^(5/2)*Sqrt[e]*(Sqrt[-d] - Sqrt[e]*x)^2) + (a
 + b*Log[c*x^n])/((-d)^(3/2)*Sqrt[e]*(Sqrt[-d] + Sqrt[e]*x)^2) + (3*(a + b
*Log[c*x^n]))/((-d)^(5/2)*Sqrt[e] + d^2*e*x) + (3*(a + b*Log[c*x^n]))/((-d
)^(3/2)*d*Sqrt[e] + d^2*e*x) + (3*b*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x])
)/((-d)^(5/2)*Sqrt[e]) - (3*b*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/((-d
)^(5/2)*Sqrt[e]) - (b*n*(d + (d - Sqrt[-d]*Sqrt[e]*x)*Log[x] + (-d + Sqrt[
-d]*Sqrt[e]*x)*Log[Sqrt[-d] + Sqrt[e]*x]))/(d^3*(Sqrt[-d]*Sqrt[e] + e*x))
- (3*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/((-d)^(5/2)*Sqrt[e]
) - (b*n*(d + (d + Sqrt[-d]*Sqrt[e]*x)*Log[x] - (d + Sqrt[-d]*Sqrt[e]*x)*L
og[(-d)^(3/2) + d*Sqrt[e]*x]))/((-d)^(7/2)*Sqrt[e] + d^3*e*x) + (3*(a + b*
Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/((-d)^(5/2)*Sqrt[e]) + (3*b
*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/((-d)^(5/2)*Sqrt[e]) - (3*b*n*PolyLog
[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/((-d)^(5/2)*Sqrt[e]))/16
```

3.238.3 Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 249, normalized size of antiderivative = 1.19, number of steps used = 9, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.450, Rules used = {2760, 215, 218, 2760, 218, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx$$

$$\Big\downarrow \ 2760$$

$$\frac{3\int \frac{a+b\log(cx^n)}{(ex^2+d)^2}dx}{4d}-\frac{bn\int \frac{1}{(ex^2+d)^2}dx}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}$$

$$\Big\downarrow \ 215$$

$$\frac{3\int \frac{a+b\log(cx^n)}{(ex^2+d)^2}dx}{4d}-\frac{bn\left(\frac{\int \frac{1}{ex^2+d}dx}{2d}+\frac{x}{2d(d+ex^2)}\right)}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}$$

$$\Big\downarrow \ 218$$

$$\frac{3\int \frac{a+b\log(cx^n)}{(ex^2+d)^2}dx}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

$$\Big\downarrow \ 2760$$

$$\frac{3\left(\frac{\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{2d}-\frac{bn\int \frac{1}{ex^2+d}dx}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}\right)}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

$$\Big\downarrow \text{218}$$

$$\frac{3\left(\frac{\int \frac{a+b\log(cx^n)}{ex^2+d}dx}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}\right)}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

$$\Big\downarrow \text{2761}$$

$$\frac{3\left(\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}\right)}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

$$\Big\downarrow \text{27}$$

$$\frac{3\left(\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}\right)}{4d}+\frac{x(a+b\log(cx^n))}{4d(d+ex^2)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

$$\Big\downarrow \text{5355}$$

3.238. $\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx$

$$\frac{3\left(\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\int\frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int\frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}dx\right)}{\sqrt{d}\sqrt{e}}}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}\right)}{4d}+$$

$$\frac{x(a+b\log(cx^n))}{4d\left(d+ex^2\right)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{3\left(\frac{\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{e}}-\frac{bn\left(\frac{1}{2}i\operatorname{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\operatorname{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}}{2d}+\frac{x(a+b\log(cx^n))}{2d(d+ex^2)}-\frac{bn\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}\right)}{4d}+$$

$$\frac{x(a+b\log(cx^n))}{4d\left(d+ex^2\right)^2}-\frac{bn\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2d^{3/2}\sqrt{e}}+\frac{x}{2d(d+ex^2)}\right)}{4d}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^2)^3,x]
```

output
```
-1/4*(b*n*(x/(2*d*(d + e*x^2)) + ArcTan[(Sqrt[e]*x)/Sqrt[d]]/(2*d^(3/2)*Sq
rt[e])))/d + (x*(a + b*Log[c*x^n]))/(4*d*(d + e*x^2)^2) + (3*(-1/2*(b*n*Ar
cTan[(Sqrt[e]*x)/Sqrt[d]])/(d^(3/2)*Sqrt[e]) + (x*(a + b*Log[c*x^n]))/(2*d
*(d + e*x^2)) + ((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(Sqrt[d]
*Sqrt[e]) - (b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] - (I/2)*PolyL
og[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e]))/(2*d)))/(4*d)
```

3.238. $\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx$

3.238.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 215
```
Int[((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(-x)*((a + b*x^2)^(p + 1)
/(2*a*(p + 1))), x] + Simp[(2*p + 3)/(2*a*(p + 1))   Int[(a + b*x^2)^(p + 1
), x], x] /; FreeQ[{a, b}, x] && LtQ[p, -1] && (IntegerQ[4*p] || IntegerQ[6
*p])
```

rule 218
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]/a)*ArcTan[x/R
t[a/b, 2]], x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

rule 2760
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_), x_Sym
bol] :> Simp[(-x)*(d + e*x^2)^(q + 1)*((a + b*Log[c*x^n])/(2*d*(q + 1))), x
] + (Simp[(2*q + 3)/(2*d*(q + 1))   Int[(d + e*x^2)^(q + 1)*(a + b*Log[c*x^
n]), x], x] + Simp[b*(n/(2*d*(q + 1)))   Int[(d + e*x^2)^(q + 1), x], x]) /
; FreeQ[{a, b, c, d, e, n}, x] && LtQ[q, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

3.238. $\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx$

3.238.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.63 (sec) , antiderivative size = 664, normalized size of antiderivative = 3.16

method	result
risch	$\frac{3bn\ln(x)x}{8d(e\,x^2+d)^2}+\frac{bx\ln(x^n)}{4d(e\,x^2+d)^2}-\frac{3bxn\ln(x)}{8d^2(e\,x^2+d)}+\frac{3bx\ln(x^n)}{8d^2(e\,x^2+d)}-\frac{3b\arctan\left(\frac{xe}{\sqrt{de}}\right)n\ln(x)}{8d^2\sqrt{de}}+\frac{3b\arctan\left(\frac{xe}{\sqrt{de}}\right)\ln(x^n)}{8d^2\sqrt{de}}-\frac{bnx}{8d^2(e\,x^2}$

input
```
int((a+b*ln(c*x^n))/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
3/8*b*n*ln(x)/d/(e*x^2+d)^2*x+1/4*b*x/d/(e*x^2+d)^2*ln(x^n)-3/8*b/d^2*x/(e
*x^2+d)*n*ln(x)+3/8*b/d^2*x/(e*x^2+d)*ln(x^n)-3/8*b/d^2/(d*e)^(1/2)*arctan
(x*e/(d*e)^(1/2))*n*ln(x)+3/8*b/d^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln
(x^n)-1/8*b*n*x/d^2/(e*x^2+d)-1/2*b*n/d^2/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/
2))+3/16*b*n*ln(x)/d^2/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d
*e)^(1/2))*x^4*e^2-3/16*b*n*ln(x)/d^2/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d
*e)^(1/2))/(-d*e)^(1/2))*x^4*e^2+3/8*b*n*ln(x)/d^2/(e*x^2+d)^2*x^3*e+3/8*b
*n*ln(x)/d/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x
^2*e-3/8*b*n*ln(x)/d/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)
^(1/2))*x^2*e+3/16*b*n*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2
))/(-d*e)^(1/2))-3/16*b*n*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1
/2))/(-d*e)^(1/2))+3/16*b*n/(-d*e)^(1/2)/d^2*dilog((-e*x+(-d*e)^(1/2))/(-d
*e)^(1/2))-3/16*b*n/(-d*e)^(1/2)/d^2*dilog((e*x+(-d*e)^(1/2))/(-d*e)^(1/2)
)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*cs
gn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x
^n)^3+b*ln(c)+a)*(1/4*x/d/(e*x^2+d)^2+3/4/d*(1/2*x/d/(e*x^2+d)+1/2/d/(d*e)
^(1/2)*arctan(x*e/(d*e)^(1/2))))
```

3.238.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^3}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 + d^3), x
)
```

3.238.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx = \int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**2+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**2)**3, x)
```

3.238.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.238.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^2 + d)^3, x)
```

3.238.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^3}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{\left(e\,x^2+d\right)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^2)^3,x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^2)^3, x)
```

3.239 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx$

3.239.1 Optimal result

Integrand size = 23, antiderivative size = 219

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx = &-\frac{15bn}{8d^3x}+\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}+\frac{5a-bn+5b\log(cx^n)}{8d^2x(d+ex^2)}\\ &-\frac{15a-8bn+15b\log(cx^n)}{8d^3x}\\ &-\frac{\sqrt{e}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(15a-8bn+15b\log(cx^n))}{8d^{7/2}}\\ &+\frac{15ib\sqrt{e}n\,\mathrm{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16d^{7/2}}-\frac{15ib\sqrt{e}n\,\mathrm{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16d^{7/2}}\end{aligned}$$

output
```
-15/8*b*n/d^3/x+1/4*(a+b*ln(c*x^n))/d/x/(e*x^2+d)^2+1/8*(5*a-b*n+5*b*ln(c*
x^n))/d^2/x/(e*x^2+d)+1/8*(-15*a+8*b*n-15*b*ln(c*x^n))/d^3/x-1/8*arctan(x*
e^(1/2)/d^(1/2))*(15*a-8*b*n+15*b*ln(c*x^n))*e^(1/2)/d^(7/2)+15/16*I*b*n*p
olylog(2,-I*x*e^(1/2)/d^(1/2))*e^(1/2)/d^(7/2)-15/16*I*b*n*polylog(2,I*x*e
^(1/2)/d^(1/2))*e^(1/2)/d^(7/2)
```

3.239.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 552 vs. $2(219) = 438$.

Time = 0.94 (sec) , antiderivative size = 552, normalized size of antiderivative = 2.52

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx = \frac{1}{16}\left(-\frac{16bn}{d^3x}-\frac{16(a+b\log(cx^n))}{d^3x}+\frac{d\sqrt{e}(a+b\log(cx^n))}{(-d)^{7/2}\left(\sqrt{-d}-\sqrt{e}x\right)^2}+\frac{7\sqrt{e}(a+b\log(cx^n))}{d^3\left(\sqrt{-d}-\sqrt{e}x\right)}+\frac{\sqrt{e}(a+b\log(cx^n))}{(-d)^{5/2}\left(\sqrt{-d}+\sqrt{e}x\right)^2}-\frac{7\sqrt{e}(a+b\log(cx^n))}{d^3\left(\sqrt{-d}+\sqrt{e}x\right)}+\frac{7b\sqrt{e}n\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}x\right)\right)}{(-d)^{7/2}}-\frac{7b\sqrt{e}n\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{(-d)^{7/2}}+\frac{bd\sqrt{e}n\left(\frac{1}{\sqrt{-d}(\sqrt{-d}+\sqrt{e}x)}-\frac{\log(x)}{d}+\frac{\log(\sqrt{-d}+\sqrt{e}x)}{d}\right)}{(-d)^{7/2}}-\frac{15\sqrt{e}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{7/2}}+\frac{b\sqrt{e}n\left(\frac{1}{\sqrt{-d}(\sqrt{-d}-\sqrt{e}x)}-\frac{\log(x)}{d}+\frac{\log((-d)^{3/2}+d\sqrt{e}x)}{d}\right)}{(-d)^{5/2}}+\frac{15\sqrt{e}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{7/2}}+\frac{15b\sqrt{e}n\,\mathrm{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{7/2}}-\frac{15b\sqrt{e}n\,\mathrm{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{7/2}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^3),x]
```

output
```
((-16*b*n)/(d^3*x) - (16*(a + b*Log[c*x^n]))/(d^3*x) + (d*Sqrt[e]*(a + b*L
og[c*x^n]))/((-d)^(7/2)*(Sqrt[-d] - Sqrt[e]*x)^2) + (7*Sqrt[e]*(a + b*Log[
c*x^n]))/(d^3*(Sqrt[-d] - Sqrt[e]*x)) + (Sqrt[e]*(a + b*Log[c*x^n]))/((-d)
^(5/2)*(Sqrt[-d] + Sqrt[e]*x)^2) - (7*Sqrt[e]*(a + b*Log[c*x^n]))/(d^3*(Sq
rt[-d] + Sqrt[e]*x)) + (7*b*Sqrt[e]*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x])
)/(-d)^(7/2) - (7*b*Sqrt[e]*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/(-d)^(
7/2) + (b*d*Sqrt[e]*n*(1/(Sqrt[-d]*(Sqrt[-d] + Sqrt[e]*x)) - Log[x]/d + Lo
g[Sqrt[-d] + Sqrt[e]*x]/d))/(-d)^(7/2) - (15*Sqrt[e]*(a + b*Log[c*x^n])*Lo
g[1 + (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(7/2) + (b*Sqrt[e]*n*(1/(Sqrt[-d]*(Sqrt[
-d] - Sqrt[e]*x)) - Log[x]/d + Log[(-d)^(3/2) + d*Sqrt[e]*x]/d))/(-d)^(5/2
) + (15*Sqrt[e]*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)
^(7/2) + (15*b*Sqrt[e]*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(7/2) - (1
5*b*Sqrt[e]*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(7/2))/16
```

3.239.3 Rubi [A] (verified)

Time = 0.80 (sec) , antiderivative size = 225, normalized size of antiderivative = 1.03, number of steps used = 10, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.435$, Rules used = {2785, 25, 2785, 25, 2780, 2741, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}dx$$

$$\Big\downarrow \text{2785}$$

$$\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}-\frac{\int -\frac{5a-bn+5b\log(cx^n)}{x^2(ex^2+d)^2}dx}{4d}$$

$$\Big\downarrow \text{25}$$

$$\frac{\int \frac{5a-bn+5b\log(cx^n)}{x^2(ex^2+d)^2}dx}{4d}+\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}$$

$$\Big\downarrow \text{2785}$$

$$\frac{\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}-\frac{\int -\frac{15a-8bn+15b\log(cx^n)}{x^2\left(ex^2+d\right)}dx}{2d}}{4d}+\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}$$

$$\Big\downarrow \text{25}$$

$$\frac{\frac{\int \frac{15a-8bn+15b\log(cx^n)}{x^2(ex^2+d)}dx}{2d}+\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}}{4d}+\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}$$

$\downarrow$ 2780

$$\frac{\frac{\frac{\int \frac{15a-8bn+15b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{15a-8bn+15b\log(cx^n)}{ex^2+d}dx}{d}}{2d}+\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}}{4d}+\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}$$

$\downarrow$ 2741

$$\frac{\frac{\frac{-\frac{15a+15b\log(cx^n)-8bn}{x}-\frac{15bn}{x}}{d}-\frac{e\int \frac{15a-8bn+15b\log(cx^n)}{ex^2+d}dx}{d}}{2d}+\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}}{4d}+\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}$$

$\downarrow$ 2761

$$\frac{\frac{\frac{-\frac{15a+15b\log(cx^n)-8bn}{x}-\frac{15bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(15a+15b\log(cx^n)-8bn)}{\sqrt{d}\sqrt{e}}-15bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx\right)}{d}}{2d}+\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}}{4d}+\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}$$

$\downarrow$ 27

$$\frac{\frac{\frac{-\frac{15a+15b\log(cx^n)-8bn}{x}-\frac{15bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(15a+15b\log(cx^n)-8bn)}{\sqrt{d}\sqrt{e}}-\frac{15bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}\right)}{d}}{2d}+\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}}{4d}+\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}$$

$\downarrow$ 5355

$$\frac{a+b\log(cx^n)}{4dx(d+ex^2)^2}+\frac{\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}+\frac{\frac{-\frac{15a+15b\log(cx^n)-8bn}{x}-\frac{15bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(15a+15b\log(cx^n)-8bn)}{\sqrt{d}\sqrt{e}}-\frac{15bn\left(\frac{1}{2}i\int \frac{\log\left(1-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{x}dx-\frac{1}{2}i\int \frac{\log\left(\frac{i\sqrt{e}x}{\sqrt{d}}+1\right)}{x}dx\right)}{\sqrt{d}\sqrt{e}}\right)}{d}}{2d}}{4d}$$

$\downarrow$ 2838

3.239. $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx$

$$\frac{a+b\log\left(cx^n\right)}{4dx\left(d+ex^2\right)^2}+\frac{\frac{5a+5b\log(cx^n)-bn}{2dx(d+ex^2)}+\frac{\frac{-\frac{15a+15b\log(cx^n)-8bn}{x}}{d}-\frac{15bn}{x}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(15a+15b\log(cx^n)-8bn)}{\sqrt{d}\sqrt{e}}-\frac{15bn\left(\frac{1}{2}i\,\mathrm{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\,\mathrm{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)\right)}{\sqrt{d}\sqrt{e}}\right)}{d}}{2d}}{4d}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^3),x]
```

output
```
(a + b*Log[c*x^n])/(4*d*x*(d + e*x^2)^2) + ((5*a - b*n + 5*b*Log[c*x^n])/(
2*d*x*(d + e*x^2)) + (((-15*b*n)/x - (15*a - 8*b*n + 15*b*Log[c*x^n])/x)/d
 - (e*((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(15*a - 8*b*n + 15*b*Log[c*x^n]))/(Sqr
t[d]*Sqrt[e]) - (15*b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] - (I/2
)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e])))/d)/(2*d))/(4*d)
```

3.239.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

3.239. $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx$

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

3.239.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.00 (sec) , antiderivative size = 964, normalized size of antiderivative = 4.40

method	result	size
risch	Expression too large to display	964

input
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/d^3/x+15/16*b*n/d^3*e/(-d*e)^(1/2)*dilog((e*x+(-d*e)^(1/2))/(-d
*e)^(1/2))+b*n*e/d^3/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))-7/8*b/d^3*e^2/(e*
x^2+d)^2*x^3*ln(x^n)-15/16*b*n/d^3*e/(-d*e)^(1/2)*dilog((-e*x+(-d*e)^(1/2)
)/(-d*e)^(1/2))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*P
i*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b
*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-1/d^3*e*((7/8*e*x^3+9/8*d*x)/(e*x^2+d)^2+
15/8/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2)))-1/d^3/x)+1/8*b*n/d^3*e*x/(e*x^2+
d)-1/4*b*n*e/d^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e
)^(1/2))+1/4*b*n*e/d^2*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/
(-d*e)^(1/2))-3/16*b*n*e/d*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^
(1/2))/(-d*e)^(1/2))+3/16*b*n*e/d*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(
-d*e)^(1/2))/(-d*e)^(1/2))-b*n/d^3/x+15/8*b*e/d^3/(d*e)^(1/2)*arctan(x*e/(
d*e)^(1/2))*n*ln(x)+1/2*b*n*e^2/d^3*ln(x)/(e*x^2+d)^2*x^3+1/2*b*n*e/d^2*ln
(x)/(e*x^2+d)^2*x-1/2*b*n/d^3*e*ln(x)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/
(-d*e)^(1/2))+1/2*b*n/d^3*e*ln(x)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e
)^(1/2))-3/16*b*n*e^3/d^3*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(
1/2))/(-d*e)^(1/2))*x^4+3/16*b*n*e^3/d^3*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln
((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^4-3/8*b*n*e^2/d^2*ln(x)/(e*x^2+d)^2/(-
d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2+3/8*b*n*e^2/d^2*ln(x)/
(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2-1/4*b*...
```

3.239.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)^3x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^8 + 3*d*e^2*x^6 + 3*d^2*e*x^4 + d^3*x^2
), x)
```

3.239.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx = \int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*(d + e*x**2)**3), x)
```

3.239.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.239.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^3x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^3*x^2), x)
```

3.239.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^2\left(d+ex^2\right)^3}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,\left(e\,x^2+d\right)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^3), x)
```

3.240 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx$

3.240.1 Optimal result

Integrand size = 23, antiderivative size = 260

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx = -\frac{35bn}{72d^3x^3}+\frac{35ben}{8d^4x}+\frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2}+\frac{7a-bn+7b\log(cx^n)}{8d^2x^3(d+ex^2)} - \frac{35a-12bn+35b\log(cx^n)}{24d^3x^3}+\frac{e(35a-12bn+35b\log(cx^n))}{8d^4x} + \frac{e^{3/2}\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(35a-12bn+35b\log(cx^n))}{8d^{9/2}} - \frac{35ibe^{3/2}n\,\mathrm{PolyLog}\left(2,-\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16d^{9/2}}+\frac{35ibe^{3/2}n\,\mathrm{PolyLog}\left(2,\frac{i\sqrt{e}x}{\sqrt{d}}\right)}{16d^{9/2}}$$

output
```
-35/72*b*n/d^3/x^3+35/8*b*e*n/d^4/x+1/4*(a+b*ln(c*x^n))/d/x^3/(e*x^2+d)^2+
1/8*(7*a-b*n+7*b*ln(c*x^n))/d^2/x^3/(e*x^2+d)+1/24*(-35*a+12*b*n-35*b*ln(c
*x^n))/d^3/x^3+1/8*e*(35*a-12*b*n+35*b*ln(c*x^n))/d^4/x+1/8*e^(3/2)*arctan
(x*e^(1/2)/d^(1/2))*(35*a-12*b*n+35*b*ln(c*x^n))/d^(9/2)-35/16*I*b*e^(3/2)
*n*polylog(2,-I*x*e^(1/2)/d^(1/2))/d^(9/2)+35/16*I*b*e^(3/2)*n*polylog(2,I
*x*e^(1/2)/d^(1/2))/d^(9/2)
```

3.240.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 584 vs. 2(260) = 520.

Time = 1.03 (sec) , antiderivative size = 584, normalized size of antiderivative = 2.25

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx = \frac{1}{144}\left(-\frac{16bn}{d^3x^3}+\frac{432ben}{d^4x}-\frac{48(a+b\log(cx^n))}{d^3x^3}+\frac{432e(a+b\log(cx^n))}{d^4x}-\frac{9e^{3/2}(a+b\log(cx^n))}{(-d)^{7/2}\left(\sqrt{-d}-\sqrt{e}x\right)^2}-\frac{99e^{3/2}(a+b\log(cx^n))}{d^4\left(\sqrt{-d}-\sqrt{e}x\right)}+\frac{9e^{3/2}(a+b\log(cx^n))}{(-d)^{7/2}\left(\sqrt{-d}+\sqrt{e}x\right)^2}+\frac{99e^{3/2}(a+b\log(cx^n))}{d^4\left(\sqrt{-d}+\sqrt{e}x\right)}+\frac{99be^{3/2}n\left(\log(x)-\log\left(\sqrt{-d}-\sqrt{e}x\right)\right)}{(-d)^{9/2}}-\frac{99be^{3/2}n\left(\log(x)-\log\left(\sqrt{-d}+\sqrt{e}x\right)\right)}{(-d)^{9/2}}-\frac{9be^{3/2}n\left(\frac{1}{\sqrt{-d}\left(\sqrt{-d}+\sqrt{e}x\right)}-\frac{\log(x)}{d}+\frac{\log\left(\sqrt{-d}+\sqrt{e}x\right)}{d}\right)}{(-d)^{7/2}}-\frac{315e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{9/2}}+\frac{9be^{3/2}n\left(\frac{1}{\sqrt{-d}\left(\sqrt{-d}-\sqrt{e}x\right)}-\frac{\log(x)}{d}+\frac{\log\left((-d)^{3/2}+d\sqrt{e}x\right)}{d}\right)}{(-d)^{7/2}}+\frac{315e^{3/2}(a+b\log(cx^n))\log\left(1+\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{9/2}}+\frac{315be^{3/2}n\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{9/2}}-\frac{315be^{3/2}n\operatorname{PolyLog}\left(2,\frac{d\sqrt{e}x}{(-d)^{3/2}}\right)}{(-d)^{9/2}}\right)$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^3),x]
```

output
```
((-16*b*n)/(d^3*x^3) + (432*b*e*n)/(d^4*x) - (48*(a + b*Log[c*x^n]))/(d^3*
x^3) + (432*e*(a + b*Log[c*x^n]))/(d^4*x) - (9*e^(3/2)*(a + b*Log[c*x^n]))
/((-d)^(7/2)*(Sqrt[-d] - Sqrt[e]*x)^2) - (99*e^(3/2)*(a + b*Log[c*x^n]))/(
d^4*(Sqrt[-d] - Sqrt[e]*x)) + (9*e^(3/2)*(a + b*Log[c*x^n]))/((-d)^(7/2)*(
Sqrt[-d] + Sqrt[e]*x)^2) + (99*e^(3/2)*(a + b*Log[c*x^n]))/(d^4*(Sqrt[-d]
+ Sqrt[e]*x)) + (99*b*e^(3/2)*n*(Log[x] - Log[Sqrt[-d] - Sqrt[e]*x]))/(-d)
^(9/2) - (99*b*e^(3/2)*n*(Log[x] - Log[Sqrt[-d] + Sqrt[e]*x]))/(-d)^(9/2)
- (9*b*e^(3/2)*n*(1/(Sqrt[-d]*(Sqrt[-d] + Sqrt[e]*x)) - Log[x]/d + Log[Sqr
t[-d] + Sqrt[e]*x]/d))/(-d)^(7/2) - (315*e^(3/2)*(a + b*Log[c*x^n])*Log[1
+ (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(9/2) + (9*b*e^(3/2)*n*(1/(Sqrt[-d]*(Sqrt[-d
] - Sqrt[e]*x)) - Log[x]/d + Log[(-d)^(3/2) + d*Sqrt[e]*x]/d))/(-d)^(7/2)
+ (315*e^(3/2)*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^
(9/2) + (315*b*e^(3/2)*n*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(9/2) - (3
15*b*e^(3/2)*n*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(9/2))/144
```

3.240.3 Rubi [A] (verified)

Time = 1.11 (sec) , antiderivative size = 270, normalized size of antiderivative = 1.04, number of steps used = 12, number of rules used = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.522, Rules used = {2785, 25, 2785, 25, 2780, 2741, 2780, 2741, 2761, 27, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}dx$$

$$\Big\downarrow \text{2785}$$

$$\frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2}-\frac{\int -\frac{7a-bn+7b\log(cx^n)}{x^4(ex^2+d)^2}dx}{4d}$$

$$\Big\downarrow \text{25}$$

$$\frac{\int \frac{7a-bn+7b\log(cx^n)}{x^4(ex^2+d)^2}dx}{4d}+\frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2}$$

$$\Big\downarrow \text{2785}$$

$$\frac{\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}-\frac{\int -\frac{35a-12bn+35b\log(cx^n)}{x^4\left(ex^2+d\right)}dx}{2d}}{4d}+\frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2}$$

$$\Big\downarrow \text{25}$$

$$\frac{\frac{\int \frac{35a-12bn+35b\log(cx^n)}{x^4\left(ex^2+d\right)}dx}{2d}+\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 2780$$

$$\frac{\frac{\frac{\int \frac{35a-12bn+35b\log(cx^n)}{x^4}dx}{d}-\frac{e\int \frac{35a-12bn+35b\log(cx^n)}{x^2\left(ex^2+d\right)}dx}{d}}{2d}+\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 2741$$

$$\frac{\frac{\frac{-\frac{35a+35b\log(cx^n)-12bn}{3x^3}-\frac{35bn}{9x^3}}{d}-\frac{e\int \frac{35a-12bn+35b\log(cx^n)}{x^2\left(ex^2+d\right)}dx}{d}}{2d}+\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 2780$$

$$\frac{\frac{\frac{-\frac{35a+35b\log(cx^n)-12bn}{3x^3}-\frac{35bn}{9x^3}}{d}-\frac{e\left(\frac{\int \frac{35a-12bn+35b\log(cx^n)}{x^2}dx}{d}-\frac{e\int \frac{35a-12bn+35b\log(cx^n)}{ex^2+d}dx}{d}\right)}{d}}{2d}+\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 2741$$

$$\frac{\frac{\frac{-\frac{35a+35b\log(cx^n)-12bn}{3x^3}-\frac{35bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{35a+35b\log(cx^n)-12bn}{x}-\frac{35bn}{x}}{d}-\frac{e\int \frac{35a-12bn+35b\log(cx^n)}{ex^2+d}dx}{d}\right)}{d}}{2d}+\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 2761$$

$$\frac{\frac{\frac{-\frac{35a+35b\log(cx^n)-12bn}{3x^3}-\frac{35bn}{9x^3}}{d}-\frac{e\left(\frac{-\frac{35a+35b\log(cx^n)-12bn}{x}-\frac{35bn}{x}}{d}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(35a+35b\log(cx^n)-12bn)}{\sqrt{d}\sqrt{e}}-35bn\int \frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{e}x}dx\right)}{d}\right)}{d}}{2d}+\frac{7a+7\cdots}{2d\cdots}}{4d}+\frac{a+b\log\left(cx^n\right)}{4dx^3\left(d+ex^2\right)^2}$$

$$\Big\downarrow \; 27$$

3.240. $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx$

$$\frac{\frac{-\frac{\frac{35a+35b\log(cx^n)-12bn}{3x^3}}{d}-\frac{35bn}{9x^3}-\frac{e\left(-\frac{\frac{35a+35b\log(cx^n)-12bn}{x}}{d}-\frac{35bn}{x}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(35a+35b\log(cx^n)-12bn)}{\sqrt{d}\sqrt{e}}-\frac{35bn\int\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}\sqrt{e}}\right)}{d}\right)}{d}}{2d}+\frac{7a+\cdots}{2\cdots}}{4d}$$

$$\frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2}$$

$\Big\downarrow$ 5355

$$\frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2}+$$

$$\frac{\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}+\frac{-\frac{\frac{35a+35b\log(cx^n)-12bn}{3x^3}}{d}-\frac{35bn}{9x^3}-\frac{e\left(-\frac{\frac{35a+35b\log(cx^n)-12bn}{x}}{d}-\frac{35bn}{x}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(35a+35b\log(cx^n)-12bn)}{\sqrt{d}\sqrt{e}}-\frac{35bn\left(\frac{1}{2}i\int\cdots\right.}{\cdots}\right.}{d}\right.}{d}}{2d}}{4d}$$

$\Big\downarrow$ 2838

$$\frac{a+b\log(cx^n)}{4dx^3(d+ex^2)^2}+$$

$$\frac{\frac{7a+7b\log(cx^n)-bn}{2dx^3(d+ex^2)}+\frac{-\frac{\frac{35a+35b\log(cx^n)-12bn}{3x^3}}{d}-\frac{35bn}{9x^3}-\frac{e\left(-\frac{\frac{35a+35b\log(cx^n)-12bn}{x}}{d}-\frac{35bn}{x}-\frac{e\left(\frac{\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(35a+35b\log(cx^n)-12bn)}{\sqrt{d}\sqrt{e}}-\frac{35bn\left(\frac{1}{2}i\,\text{Po}\cdots\right.}{\cdots}\right.}{d}\right.}{d}}{2d}}{4d}$$

input

```
Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^3),x]
```

3.240. $\int\frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx$

output
```
(a + b*Log[c*x^n])/(4*d*x^3*(d + e*x^2)^2) + ((7*a - b*n + 7*b*Log[c*x^n])
/(2*d*x^3*(d + e*x^2)) + (((-35*b*n)/(9*x^3) - (35*a - 12*b*n + 35*b*Log[c
*x^n])/(3*x^3))/d - (e*(((-35*b*n)/x - (35*a - 12*b*n + 35*b*Log[c*x^n])/x
)/d - (e*((ArcTan[(Sqrt[e]*x)/Sqrt[d]]*(35*a - 12*b*n + 35*b*Log[c*x^n]))/
(Sqrt[d]*Sqrt[e]) - (35*b*n*((I/2)*PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] -
(I/2)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/(Sqrt[d]*Sqrt[e])))/d))/d)/(2*d)
)/(4*d)
```

3.240.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2785
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^2)^(q_.), x_Symbol] :> Simp[(-(f*x)^(m + 1))*(d + e*x^2)^(q + 1)*((a +
 b*Log[c*x^n])/(2*d*f*(q + 1))), x] + Simp[1/(2*d*(q + 1))   Int[(f*x)^m*(d
 + e*x^2)^(q + 1)*(a*(m + 2*q + 3) + b*n + b*(m + 2*q + 3)*Log[c*x^n]), x],
 x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && ILtQ[q, -1] && ILtQ[m, 0]
```

3.240. $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx$

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

3.240.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.39 (sec) , antiderivative size = 1029, normalized size of antiderivative = 3.96

method	result	size
risch	Expression too large to display	1029

input
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^3,x,method=_RETURNVERBOSE)
```

output
```
1/2*b*n*e^2/d^3*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)
^(1/2))-1/2*b*n*e^2/d^3*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))
/(-d*e)^(1/2))+3/16*b*n*e^2/d^2*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-
d*e)^(1/2))/(-d*e)^(1/2))-3/16*b*n*e^2/d^2*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*
ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csg
n(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csg
n(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/d^4*e^2*((11/8*e*x^3
+13/8*d*x)/(e*x^2+d)^2+35/8/(d*e)^(1/2)*arctan(x*e/(d*e)^(1/2)))-1/3/d^3/x
^3+3/d^4*e/x)+3*b*e*n/d^4/x+b*n/d^4*e^2*ln(x)*x/(e*x^2+d)+35/8*b*e^2/d^4/(
d*e)^(1/2)*arctan(x*e/(d*e)^(1/2))*ln(x^n)+35/16*b*n/d^4*e^2/(-d*e)^(1/2)*
dilog((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-35/16*b*n/d^4*e^2/(-d*e)^(1/2)*dil
og((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))-3/2*b*n*e^2/d^4/(d*e)^(1/2)*arctan(x*e
/(d*e)^(1/2))+11/8*b/d^4*e^3/(e*x^2+d)^2*x^3*ln(x^n)+3/8*b*n*e^3/d^3*ln(x)
/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2-3/8*b*n
*e^3/d^3*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2)
)*x^2+1/2*b*n*e^3/d^4*ln(x)/(e*x^2+d)/(-d*e)^(1/2)*ln((-e*x+(-d*e)^(1/2))/
(-d*e)^(1/2))*x^2+3/16*b*n*e^4/d^4*ln(x)/(e*x^2+d)^2/(-d*e)^(1/2)*ln((-e*x
+(-d*e)^(1/2))/(-d*e)^(1/2))*x^4-3/16*b*n*e^4/d^4*ln(x)/(e*x^2+d)^2/(-d*e)
^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^4-1/2*b*n*e^3/d^4*ln(x)/(e*x^
2+d)/(-d*e)^(1/2)*ln((e*x+(-d*e)^(1/2))/(-d*e)^(1/2))*x^2-1/3*b*ln(x^n)...
```

3.240.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^3x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^3*x^10 + 3*d*e^2*x^8 + 3*d^2*e*x^6 + d^3*x^
4), x)
```

3.240.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**3,x)
```

output
```
Timed out
```

3.240.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.240.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^3}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^3x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^3*x^4), x)
```

3.240.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^3}\,dx = \int \frac{a+b\,\ln\left(c\,x^n\right)}{x^4\,\left(e\,x^2+d\right)^3}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^3), x)
```

3.241 $\int \frac{x \log(cx^2)}{1-cx^2} dx$

3.241.1 Optimal result

Integrand size = 18, antiderivative size = 17

$$\int \frac{x \log(cx^2)}{1-cx^2} dx = \frac{\text{PolyLog}(2, 1-cx^2)}{2c}$$

output
```
1/2*polylog(2,-c*x^2+1)/c
```

3.241.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{x \log(cx^2)}{1-cx^2} dx = \frac{\text{PolyLog}(2, 1-cx^2)}{2c}$$

input
```
Integrate[(x*Log[c*x^2])/(1 - c*x^2),x]
```

output
```
PolyLog[2, 1 - c*x^2]/(2*c)
```

3.241.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {2774, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x \log(cx^2)}{1-cx^2} \, dx$$
$$\Big\downarrow \; 2774$$
$$\frac{1}{2}\int \frac{\log(cx^2)}{1-cx^2} dx^2$$
$$\Big\downarrow \; 2752$$
$$\frac{\text{PolyLog}(2,1-cx^2)}{2c}$$

input
```
Int[(x*Log[c*x^2])/(1 - c*x^2),x]
```

output
```
PolyLog[2, 1 - c*x^2]/(2*c)
```

3.241.3.1 Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

3.241.4 Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.71

method	result	size
derivativedivides	$\frac{\operatorname{dilog}(c\,x^{2})}{2c}$	12
default	$\frac{\operatorname{dilog}(c\,x^{2})}{2c}$	12
risch	$\frac{\operatorname{dilog}(c\,x^{2})}{2c}$	12
parts	$-\frac{\ln(c\,x^{2})\ln(c\,x^{2}-1)}{2c}+\frac{\ln(x)\ln(c\,x^{2}-1)-2c\left(\frac{\ln(x)(\ln(1-\sqrt{c}\,x)+\ln(1+\sqrt{c}\,x))}{2c}+\frac{\operatorname{dilog}(1-\sqrt{c}\,x)+\operatorname{dilog}(1+\sqrt{c}\,x)}{2c}\right)}{c}$	89

input
```
int(x*ln(c*x^2)/(-c*x^2+1),x,method=_RETURNVERBOSE)
```

output
```
1/2/c*dilog(c*x^2)
```

3.241.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{x\log(cx^2)}{1-cx^2}\,dx = \frac{\mathrm{Li}_2(-cx^2+1)}{2\,c}$$

input
```
integrate(x*log(c*x^2)/(-c*x^2+1),x, algorithm="fricas")
```

output
```
1/2*dilog(-c*x^2 + 1)/c
```

3.241.6 Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 4.08 (sec) , antiderivative size = 94, normalized size of antiderivative = 5.53

$$\int \frac{x\log(cx^2)}{1-cx^2}\,dx = \frac{\begin{cases} -\frac{\mathrm{Li}_2(cx^2)}{2} & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ i\pi\log(x)-\frac{\mathrm{Li}_2(cx^2)}{2} & \text{for } |x|<1 \\ -i\pi\log\left(\frac{1}{x}\right)-\frac{\mathrm{Li}_2(cx^2)}{2} & \text{for } \frac{1}{|x|}<1 \\ -i\pi G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)+i\pi G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)-\frac{\mathrm{Li}_2(cx^2)}{2} & \text{otherwise} \end{cases}}{c} - \frac{\log(cx^2)\log(cx^2-1)}{2c}$$

input
```
integrate(x*ln(c*x**2)/(-c*x**2+1),x)
```

output
```
Piecewise((-polylog(2, c*x**2)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (I*pi*lo
g(x) - polylog(2, c*x**2)/2, Abs(x) < 1), (-I*pi*log(1/x) - polylog(2, c*x
**2)/2, 1/Abs(x) < 1), (-I*pi*meijerg(((), (1, 1)), ((0, 0), ()), x) + I*p
i*meijerg(((1, 1), ()), ((), (0, 0)), x) - polylog(2, c*x**2)/2, True))/c
- log(c*x**2)*log(c*x**2 - 1)/(2*c)
```

3.241.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 76 vs. 2(14) = 28.

Time = 0.18 (sec) , antiderivative size = 76, normalized size of antiderivative = 4.47

$$\int \frac{x\log(cx^2)}{1-cx^2}\,dx = -\frac{\log(cx^2-1)\log(cx^2)}{2\,c} + \frac{\log(cx^2-1)\log(x)}{c} + \frac{\log(cx^2-1)\log(cx^2) - 2\,\log(cx^2-1)\log(x) + \mathrm{Li}_2(-cx^2+1)}{2\,c}$$

input
```
integrate(x*log(c*x^2)/(-c*x^2+1),x, algorithm="maxima")
```

output
```
-1/2*log(c*x^2 - 1)*log(c*x^2)/c + log(c*x^2 - 1)*log(x)/c + 1/2*(log(c*x^
2 - 1)*log(c*x^2) - 2*log(c*x^2 - 1)*log(x) + dilog(-c*x^2 + 1))/c
```

3.241.8 Giac [F]

$$\int \frac{x\log(cx^2)}{1-cx^2}\,dx = \int -\frac{x\log(cx^2)}{cx^2-1}\,dx$$

input
```
integrate(x*log(c*x^2)/(-c*x^2+1),x, algorithm="giac")
```

output
```
integrate(-x*log(c*x^2)/(c*x^2 - 1), x)
```

3.241.9 Mupad [B] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.65

$$\int \frac{x\log(cx^2)}{1-cx^2}\,dx = \frac{\mathrm{Li}_2(c\,x^2)}{2\,c}$$

input
```
int(-(x*log(c*x^2))/(c*x^2 - 1),x)
```

output
```
dilog(c*x^2)/(2*c)
```

3.242 $\int \frac{x \log\left(\frac{x^2}{c}\right)}{c-x^2} dx$

3.242.1 Optimal result

Integrand size = 19, antiderivative size = 16

$$\int \frac{x \log\left(\frac{x^2}{c}\right)}{c-x^2} dx = \frac{1}{2} \text{PolyLog}\left(2, 1-\frac{x^2}{c}\right)$$

output
```
1/2*polylog(2,1-x^2/c)
```

3.242.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{x \log\left(\frac{x^2}{c}\right)}{c-x^2} dx = \frac{1}{2} \text{PolyLog}\left(2, \frac{c-x^2}{c}\right)$$

input
```
Integrate[(x*Log[x^2/c])/(c - x^2),x]
```

output
```
PolyLog[2, (c - x^2)/c]/2
```

3.242.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$, Rules used = {2774, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x \log\left(\frac{x^2}{c}\right)}{c-x^2} \, dx$$

$$\Big\downarrow \ 2774$$

$$\frac{1}{2} \int \frac{\log\left(\frac{x^2}{c}\right)}{c-x^2} dx^2$$

$$\Big\downarrow \ 2752$$

$$\frac{1}{2} \text{PolyLog}\left(2, 1-\frac{x^2}{c}\right)$$

input
```
Int[(x*Log[x^2/c])/(c - x^2),x]
```

output
```
PolyLog[2, 1 - x^2/c]/2
```

3.242.3.1 Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

3.242.4 Maple [C] (verified)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.40 (sec) , antiderivative size = 53, normalized size of antiderivative = 3.31

method	result
default	$\frac{\left(\sum_{\_\alpha=\mathrm{RootOf}\left(\_Z^2-c\right)}\left(-\ln(x-\_\alpha)\ln\left(\frac{x^2}{c}\right)+2\,\mathrm{dilog}\left(\frac{x}{\_\alpha}\right)+2\ln(x-\_\alpha)\ln\left(\frac{x}{\_\alpha}\right)\right)\right)}{2}$
risch	$\frac{\left(\sum_{\_\alpha=\mathrm{RootOf}\left(\_Z^2-c\right)}\left(-\ln(x-\_\alpha)\ln\left(\frac{x^2}{c}\right)+2\,\mathrm{dilog}\left(\frac{x}{\_\alpha}\right)+2\ln(x-\_\alpha)\ln\left(\frac{x}{\_\alpha}\right)\right)\right)}{2}$
parts	$-\frac{\ln\left(\frac{x^2}{c}\right)\ln(-x^2+c)}{2}+\ln(x)\ln(-x^2+c)-\ln(x)\ln\left(\frac{\sqrt{c}-x}{\sqrt{c}}\right)-\ln(x)\ln\left(\frac{\sqrt{c}+x}{\sqrt{c}}\right)-\mathrm{dilog}\left(\frac{\sqrt{c}-x}{\sqrt{c}}\right)-\mathrm{d}$

input
```
int(x*ln(x^2/c)/(-x^2+c),x,method=_RETURNVERBOSE)
```

output
```
1/2*sum(-ln(x-_alpha)*ln(x^2/c)+2*dilog(x/_alpha)+2*ln(x-_alpha)*ln(x/_alp
ha),_alpha=RootOf(_Z^2-c))
```

3.242.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

$$\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx=\frac{1}{2}\,\mathrm{Li}_2\left(-\frac{x^2}{c}+1\right)$$

input
```
integrate(x*log(x^2/c)/(-x^2+c),x, algorithm="fricas")
```

output
```
1/2*dilog(-x^2/c + 1)
```

3.242.6 Sympy [A] (verification not implemented)

Time = 2.84 (sec) , antiderivative size = 117, normalized size of antiderivative = 7.31

$$\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx = \begin{cases} -\frac{\operatorname{Li}_2\left(\frac{x^2}{c}\right)}{2} \\ \log(c)\log(x) + i\pi\log(x) - \frac{\operatorname{Li}_2\left(\frac{x^2}{c}\right)}{2} \\ -\log(c)\log\left(\frac{1}{x}\right) - i\pi\log\left(\frac{1}{x}\right) - \frac{\operatorname{Li}_2\left(\frac{x^2}{c}\right)}{2} \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(c) - i\pi G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right) + G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(c) + i\pi G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right) \end{cases} - \frac{\log\left(\frac{x^2}{c}\right)\log(-c+x^2)}{2}$$

input
```
integrate(x*ln(x**2/c)/(-x**2+c),x)
```

output
```
Piecewise((-polylog(2, x**2/c)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(c)*
log(x) + I*pi*log(x) - polylog(2, x**2/c)/2, Abs(x) < 1), (-log(c)*log(1/x
) - I*pi*log(1/x) - polylog(2, x**2/c)/2, 1/Abs(x) < 1), (-meijerg(((), (1
, 1)), ((0, 0), ()), x)*log(c) - I*pi*meijerg(((), (1, 1)), ((0, 0), ()),
x) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(c) + I*pi*meijerg(((1, 1),
 ()), ((), (0, 0)), x) - polylog(2, x**2/c)/2, True)) - log(x**2/c)*log(-c
 + x**2)/2
```

3.242.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 58 vs. $2(13) = 26$.

Time = 0.19 (sec) , antiderivative size = 58, normalized size of antiderivative = 3.62

$$\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx = -\frac{1}{2}\log\left(x^2-c\right)\log\left(\frac{x^2}{c}\right) + \frac{1}{2}\log\left(x^2-c\right)\log\left(\frac{x^2-c}{c}+1\right) + \frac{1}{2}\operatorname{Li}_2\left(-\frac{x^2-c}{c}\right)$$

input
```
integrate(x*log(x^2/c)/(-x^2+c),x, algorithm="maxima")
```

output
```
-1/2*log(x^2 - c)*log(x^2/c) + 1/2*log(x^2 - c)*log((x^2 - c)/c + 1) + 1/2
*dilog(-(x^2 - c)/c)
```

3.242.8 Giac [F]

$$\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx = \int -\frac{x\log\left(\frac{x^2}{c}\right)}{x^2-c}\,dx$$

input
```
integrate(x*log(x^2/c)/(-x^2+c),x, algorithm="giac")
```

output
```
integrate(-x*log(x^2/c)/(x^2 - c), x)
```

3.242.9 Mupad [B] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.62

$$\int \frac{x\log\left(\frac{x^2}{c}\right)}{c-x^2}\,dx = \frac{\mathrm{Li}_2\left(\frac{x^2}{c}\right)}{2}$$

input
```
int((x*log(x^2/c))/(c - x^2),x)
```

output
```
dilog(x^2/c)/2
```

3.243 $\int \frac{\log(x)}{1-x^2} \, dx$

3.243.1 Optimal result

Integrand size = 12, antiderivative size = 22

$$\int \frac{\log(x)}{1-x^2} \, dx = \operatorname{arctanh}(x)\log(x) + \frac{\operatorname{PolyLog}(2,-x)}{2} - \frac{\operatorname{PolyLog}(2,x)}{2}$$

output
```
arctanh(x)*ln(x)+1/2*polylog(2,-x)-1/2*polylog(2,x)
```

3.243.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.41

$$\int \frac{\log(x)}{1-x^2} \, dx = \frac{1}{2}\log(x)\log(1+x) + \frac{\operatorname{PolyLog}(2,1-x)}{2} + \frac{\operatorname{PolyLog}(2,-x)}{2}$$

input
```
Integrate[Log[x]/(1 - x^2),x]
```

output
```
(Log[x]*Log[1 + x])/2 + PolyLog[2, 1 - x]/2 + PolyLog[2, -x]/2
```

3.243.3 Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {2761, 6446}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log(x)}{1-x^2} \, dx$$

$$\Big\downarrow \text{ 2761}$$

$$\text{arctanh}(x)\log(x) - \int \frac{\text{arctanh}(x)}{x} dx$$

$$\Big\downarrow \text{ 6446}$$

$$\text{arctanh}(x)\log(x) + \frac{\text{PolyLog}(2,-x)}{2} - \frac{\text{PolyLog}(2,x)}{2}$$

input
```
Int[Log[x]/(1 - x^2),x]
```

output
```
ArcTanh[x]*Log[x] + PolyLog[2, -x]/2 - PolyLog[2, x]/2
```

3.243.3.1 Defintions of rubi rules used

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 6446
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x
] + (-Simp[(b/2)*PolyLog[2, (-c)*x], x] + Simp[(b/2)*PolyLog[2, c*x], x]) /
; FreeQ[{a, b, c}, x]
```

3.243.4 Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

method	result	size
default	$\frac{\mathrm{dilog}(x)}{2}+\frac{\mathrm{dilog}(x+1)}{2}+\frac{\ln(x)\ln(x+1)}{2}$	20
risch	$\frac{\mathrm{dilog}(x)}{2}+\frac{\mathrm{dilog}(x+1)}{2}+\frac{\ln(x)\ln(x+1)}{2}$	20
parts	$\frac{\mathrm{dilog}(x)}{2}+\frac{\mathrm{dilog}(x+1)}{2}+\frac{\ln(x)\ln(x+1)}{2}$	20
meijerg	$\left(\frac{\ln(x)\Phi\left(x^2,1,\frac{1}{2}\right)}{2}-\frac{\Phi\left(x^2,2,\frac{1}{2}\right)}{4}\right)x$	22

input
```
int(ln(x)/(-x^2+1),x,method=_RETURNVERBOSE)
```

output
```
1/2*dilog(x)+1/2*dilog(x+1)+1/2*ln(x)*ln(x+1)
```

3.243.5 Fricas [F]

$$\int \frac{\log(x)}{1-x^2}\,dx=\int -\frac{\log(x)}{x^2-1}\,dx$$

input
```
integrate(log(x)/(-x^2+1),x, algorithm="fricas")
```

output
```
integral(-log(x)/(x^2 - 1), x)
```

3.243.6 Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 5.44 (sec) , antiderivative size = 85, normalized size of antiderivative = 3.86

$$\int \frac{\log(x)}{1-x^2}\,dx = \frac{\begin{cases} -\operatorname{Li}_2(x) & \text{for } \frac{1}{|x|} < 1 \wedge |x| < 1 \\ i\pi\log(x) - \operatorname{Li}_2(x) & \text{for } |x| < 1 \\ -i\pi\log\left(\frac{1}{x}\right) - \operatorname{Li}_2(x) & \text{for } \frac{1}{|x|} < 1 \\ -i\pi G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix} \middle| x\right) + i\pi G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix} \middle| x\right) - \operatorname{Li}_2(x) & \text{otherwise} \end{cases}}{2} - \frac{\log(x)\log(x-1)}{2} + \frac{\log(x)\log(x+1)}{2} + \frac{\operatorname{Li}_2\left(xe^{i\pi}\right)}{2}$$

input
```
integrate(ln(x)/(-x**2+1),x)
```

output
```
Piecewise((-polylog(2, x), (Abs(x) < 1) & (1/Abs(x) < 1)), (I*pi*log(x) -
polylog(2, x), Abs(x) < 1), (-I*pi*log(1/x) - polylog(2, x), 1/Abs(x) < 1)
, (-I*pi*meijerg(((), (1, 1)), ((0, 0), ()), x) + I*pi*meijerg(((1, 1), ()
), ((), (0, 0)), x) - polylog(2, x), True))/2 - log(x)*log(x - 1)/2 + log(
x)*log(x + 1)/2 + polylog(2, x*exp_polar(I*pi))/2
```

3.243.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 48 vs. 2(16) = 32.

Time = 0.19 (sec) , antiderivative size = 48, normalized size of antiderivative = 2.18

$$\int \frac{\log(x)}{1-x^2}\,dx = -\frac{1}{2}\log(-x)\log(x+1) + \frac{1}{2}(\log(x+1) - \log(x-1))\log(x) + \frac{1}{2}\log(x-1)\log(x) - \frac{1}{2}\operatorname{Li}_2(x+1) + \frac{1}{2}\operatorname{Li}_2(-x+1)$$

input
```
integrate(log(x)/(-x^2+1),x, algorithm="maxima")
```

output
```
-1/2*log(-x)*log(x + 1) + 1/2*(log(x + 1) - log(x - 1))*log(x) + 1/2*log(x
 - 1)*log(x) - 1/2*dilog(x + 1) + 1/2*dilog(-x + 1)
```

3.243.8 Giac [F]

$$\int \frac{\log(x)}{1-x^2} \, dx = \int -\frac{\log(x)}{x^2-1} \, dx$$

input
```
integrate(log(x)/(-x^2+1),x, algorithm="giac")
```

output
```
integrate(-log(x)/(x^2 - 1), x)
```

3.243.9 Mupad [B] (verification not implemented)

Time = 0.04 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.82

$$\int \frac{\log(x)}{1-x^2} \, dx = \operatorname{atanh}(x) \ln(x) + \frac{\operatorname{polylog}(2,-x)}{2} - \frac{\operatorname{polylog}(2,x)}{2}$$

input
```
int(-log(x)/(x^2 - 1),x)
```

output
```
atanh(x)*log(x) + polylog(2, -x)/2 - polylog(2, x)/2
```

3.244 $\int \frac{\log(x)}{1+x^2} \, dx$

3.244.1 Optimal result

Integrand size = 10, antiderivative size = 32

$$\int \frac{\log(x)}{1+x^2} \, dx = \arctan(x)\log(x) - \frac{1}{2}i\,\text{PolyLog}(2,-ix) + \frac{1}{2}i\,\text{PolyLog}(2,ix)$$

output
```
arctan(x)*ln(x)-1/2*I*polylog(2,-I*x)+1/2*I*polylog(2,I*x)
```

3.244.2 Mathematica [B] (verified)

Both result and optimal contain complex but leaf count is larger than twice the leaf count of optimal. 65 vs. 2(32) = 64.

Time = 0.01 (sec) , antiderivative size = 65, normalized size of antiderivative = 2.03

$$\int \frac{\log(x)}{1+x^2} \, dx = -\frac{1}{2}i\log(-i(i-x))\log(x) + \frac{1}{2}i\log(x)\log(-i(i+x)) - \frac{1}{2}i\,\text{PolyLog}(2,-ix) + \frac{1}{2}i\,\text{PolyLog}(2,ix)$$

input
```
Integrate[Log[x]/(1 + x^2),x]
```

output
```
(-1/2*I)*Log[(-I)*(I - x)]*Log[x] + (I/2)*Log[x]*Log[(-I)*(I + x)] - (I/2)
*PolyLog[2, (-I)*x] + (I/2)*PolyLog[2, I*x]
```

3.244.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.300, Rules used = {2761, 5355, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log(x)}{x^2+1}dx$$

$$\Big\downarrow \text{ 2761}$$

$$\arctan(x)\log(x)-\int \frac{\arctan(x)}{x}dx$$

$$\Big\downarrow \text{ 5355}$$

$$-\frac{1}{2}i\int \frac{\log(1-ix)}{x}dx+\frac{1}{2}i\int \frac{\log(ix+1)}{x}dx+\arctan(x)\log(x)$$

$$\Big\downarrow \text{ 2838}$$

$$\arctan(x)\log(x)-\frac{1}{2}i\,\text{PolyLog}(2,-ix)+\frac{1}{2}i\,\text{PolyLog}(2,ix)$$

input
```
Int[Log[x]/(1 + x^2),x]
```

output
```
ArcTan[x]*Log[x] - (I/2)*PolyLog[2, (-I)*x] + (I/2)*PolyLog[2, I*x]
```

3.244.3.1 Defintions of rubi rules used

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 5355
```
Int[((a_.) + ArcTan[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x]
 + (Simp[I*(b/2)   Int[Log[1 - I*c*x]/x, x], x] - Simp[I*(b/2)   Int[Log[1
+ I*c*x]/x, x], x]) /; FreeQ[{a, b, c}, x]
```

3.244.4 Maple [C] (verified)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.62 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.81

method	result	size
meijerg	$\left(\frac{\ln(x)\Phi\left(-x^2,1,\frac{1}{2}\right)}{2}-\frac{\Phi\left(-x^2,2,\frac{1}{2}\right)}{4}\right)x$	26
default	$-\frac{i\ln(x)\ln(ix+1)}{2}+\frac{i\ln(x)\ln(-ix+1)}{2}-\frac{i\,\mathrm{dilog}(ix+1)}{2}+\frac{i\,\mathrm{dilog}(-ix+1)}{2}$	46
risch	$-\frac{i\ln(x)\ln(ix+1)}{2}+\frac{i\ln(x)\ln(-ix+1)}{2}-\frac{i\,\mathrm{dilog}(ix+1)}{2}+\frac{i\,\mathrm{dilog}(-ix+1)}{2}$	46
parts	$-\frac{i\ln(x)\ln(ix+1)}{2}+\frac{i\ln(x)\ln(-ix+1)}{2}-\frac{i\,\mathrm{dilog}(ix+1)}{2}+\frac{i\,\mathrm{dilog}(-ix+1)}{2}$	46

input
```
int(ln(x)/(x^2+1),x,method=_RETURNVERBOSE)
```

output
```
(1/2*ln(x)*LerchPhi(-x^2,1,1/2)-1/4*LerchPhi(-x^2,2,1/2))*x
```

3.244.5 Fricas [F]

$$\int \frac{\log(x)}{1+x^2}\,dx = \int \frac{\log(x)}{x^2+1}\,dx$$

input
```
integrate(log(x)/(x^2+1),x, algorithm="fricas")
```

output
```
integral(log(x)/(x^2 + 1), x)
```

3.244.6 Sympy [F]

$$\int \frac{\log(x)}{1+x^2}\,dx = \int \frac{\log(x)}{x^2+1}\,dx$$

input
```
integrate(ln(x)/(x**2+1),x)
```

output
```
Integral(log(x)/(x**2 + 1), x)
```

3.244.7 Maxima [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.81

$$\int \frac{\log(x)}{1+x^2}\,dx = \frac{1}{4}\pi\log\left(x^2+1\right) + \frac{1}{2}i\,\mathrm{Li}_2(i\,x+1) - \frac{1}{2}i\,\mathrm{Li}_2(-i\,x+1)$$

input
```
integrate(log(x)/(x^2+1),x, algorithm="maxima")
```

output
```
1/4*pi*log(x^2 + 1) + 1/2*I*dilog(I*x + 1) - 1/2*I*dilog(-I*x + 1)
```

3.244.8 Giac [F]

$$\int \frac{\log(x)}{1+x^2}\,dx = \int \frac{\log(x)}{x^2+1}\,dx$$

input
```
integrate(log(x)/(x^2+1),x, algorithm="giac")
```

output
```
integrate(log(x)/(x^2 + 1), x)
```

3.244.9 Mupad [B] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.75

$$\int \frac{\log(x)}{1+x^2}\,dx = \mathrm{atan}(x)\,\ln(x) - \frac{\mathrm{polylog}(2,-x\,1\mathrm{i})\,1\mathrm{i}}{2} + \frac{\mathrm{polylog}(2,x\,1\mathrm{i})\,1\mathrm{i}}{2}$$

input
```
int(log(x)/(x^2 + 1),x)
```

output
```
atan(x)*log(x) - (polylog(2, -x*1i)*1i)/2 + (polylog(2, x*1i)*1i)/2
```

3.245 $\int \frac{a+b\log(cx)}{1-ex^2}\,dx$

3.245.1 Optimal result

Integrand size = 19, antiderivative size = 62

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx = \frac{\operatorname{arctanh}\left(\sqrt{e}x\right)(a+b\log(cx))}{\sqrt{e}} + \frac{b\operatorname{PolyLog}\left(2,-\sqrt{e}x\right)}{2\sqrt{e}} - \frac{b\operatorname{PolyLog}\left(2,\sqrt{e}x\right)}{2\sqrt{e}}$$

output
```
arctanh(x*e^(1/2))*(a+b*ln(c*x))/e^(1/2)+1/2*b*polylog(2,-x*e^(1/2))/e^(1/
2)-1/2*b*polylog(2,x*e^(1/2))/e^(1/2)
```

3.245.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx = \frac{-\left((a+b\log(cx))\left(\log\left(1-\sqrt{e}x\right)-\log\left(1+\sqrt{e}x\right)\right)\right)+b\operatorname{PolyLog}\left(2,-\sqrt{e}x\right)-b\operatorname{PolyLog}\left(2,\sqrt{e}x\right)}{2\sqrt{e}}$$

input
```
Integrate[(a + b*Log[c*x])/(1 - e*x^2),x]
```

output
```
(-((a + b*Log[c*x])*(Log[1 - Sqrt[e]*x] - Log[1 + Sqrt[e]*x])) + b*PolyLog
[2, -(Sqrt[e]*x)] - b*PolyLog[2, Sqrt[e]*x])/(2*Sqrt[e])
```

3.245.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 59, normalized size of antiderivative = 0.95, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158, Rules used = {2761, 27, 6446}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx$$

$$\Big\downarrow \ 2761$$

$$\frac{\operatorname{arctanh}\left(\sqrt{e}x\right)(a+b\log(cx))}{\sqrt{e}}-b\int \frac{\operatorname{arctanh}\left(\sqrt{e}x\right)}{\sqrt{e}x}dx$$

$$\Big\downarrow \ 27$$

$$\frac{\operatorname{arctanh}\left(\sqrt{e}x\right)(a+b\log(cx))}{\sqrt{e}}-\frac{b\int \frac{\operatorname{arctanh}\left(\sqrt{e}x\right)}{x}dx}{\sqrt{e}}$$

$$\Big\downarrow \ 6446$$

$$\frac{\operatorname{arctanh}\left(\sqrt{e}x\right)(a+b\log(cx))}{\sqrt{e}}-\frac{b\left(\frac{\operatorname{PolyLog}\left(2,\sqrt{e}x\right)}{2}-\frac{1}{2}\operatorname{PolyLog}\left(2,-\sqrt{e}x\right)\right)}{\sqrt{e}}$$

input
```
Int[(a + b*Log[c*x])/(1 - e*x^2),x]
```

output
```
(ArcTanh[Sqrt[e]*x]*(a + b*Log[c*x]))/Sqrt[e] - (b*(-1/2*PolyLog[2, -(Sqrt
[e]*x)] + PolyLog[2, Sqrt[e]*x]/2))/Sqrt[e]
```

3.245.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 6446
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x
] + (-Simp[(b/2)*PolyLog[2, (-c)*x], x] + Simp[(b/2)*PolyLog[2, c*x], x]) /
; FreeQ[{a, b, c}, x]
```

3.245.4 Maple [C] (verified)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.62 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.85

method	result
meijerg	$\frac{a\,\operatorname{arctanh}(x\sqrt{e})}{\sqrt{e}}+\left(\frac{b\ln(x)\Phi(e\,x^{2},1,\frac{1}{2})}{2}-\frac{b\Phi(e\,x^{2},2,\frac{1}{2})}{4}\right)x+\frac{b\ln(c)\operatorname{arctanh}(x\sqrt{e})}{\sqrt{e}}$
parts	$\frac{a\,\operatorname{arctanh}(x\sqrt{e})}{\sqrt{e}}-bc\left(\frac{\ln(xc)\left(\ln\left(-\frac{\sqrt{e}\,xc-c}{c}\right)-\ln\left(\frac{\sqrt{e}\,xc+c}{c}\right)\right)}{2\sqrt{e}\,c}+\frac{\operatorname{dilog}\left(-\frac{\sqrt{e}\,xc-c}{c}\right)-\operatorname{dilog}\left(\frac{\sqrt{e}\,xc+c}{c}\right)}{2\sqrt{e}\,c}\right)$
risch	$\frac{a\,\operatorname{arctanh}(x\sqrt{e})}{\sqrt{e}}-\frac{b\ln(xc)\ln\left(-\frac{\sqrt{e}\,xc-c}{c}\right)}{2\sqrt{e}}+\frac{b\ln(xc)\ln\left(\frac{\sqrt{e}\,xc+c}{c}\right)}{2\sqrt{e}}-\frac{b\operatorname{dilog}\left(-\frac{\sqrt{e}\,xc-c}{c}\right)}{2\sqrt{e}}+\frac{b\operatorname{dilog}\left(\frac{\sqrt{e}\,xc+c}{c}\right)}{2\sqrt{e}}$
derivativedivides	$\frac{\frac{ca\,\operatorname{arctanh}(x\sqrt{e})}{\sqrt{e}}+c^{2}b\left(-\frac{\ln(xc)\left(\ln\left(-\frac{\sqrt{e}\,xc-c}{c}\right)-\ln\left(\frac{\sqrt{e}\,xc+c}{c}\right)\right)}{2\sqrt{e}\,c}-\frac{\operatorname{dilog}\left(-\frac{\sqrt{e}\,xc-c}{c}\right)-\operatorname{dilog}\left(\frac{\sqrt{e}\,xc+c}{c}\right)}{2\sqrt{e}\,c}\right)}{c}$
default	$\frac{\frac{ca\,\operatorname{arctanh}(x\sqrt{e})}{\sqrt{e}}+c^{2}b\left(-\frac{\ln(xc)\left(\ln\left(-\frac{\sqrt{e}\,xc-c}{c}\right)-\ln\left(\frac{\sqrt{e}\,xc+c}{c}\right)\right)}{2\sqrt{e}\,c}-\frac{\operatorname{dilog}\left(-\frac{\sqrt{e}\,xc-c}{c}\right)-\operatorname{dilog}\left(\frac{\sqrt{e}\,xc+c}{c}\right)}{2\sqrt{e}\,c}\right)}{c}$

input
```
int((a+b*ln(x*c))/(-e*x^2+1),x,method=_RETURNVERBOSE)
```

output
```
a/e^(1/2)*arctanh(x*e^(1/2))+(1/2*b*ln(x)*LerchPhi(e*x^2,1,1/2)-1/4*b*Lerc
hPhi(e*x^2,2,1/2))*x+b*ln(c)/e^(1/2)*arctanh(x*e^(1/2))
```

3.245.5 Fricas [F]

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx=\int -\frac{b\log(cx)+a}{ex^2-1}\,dx$$

input
```
integrate((a+b*log(c*x))/(-e*x^2+1),x, algorithm="fricas")
```

output
```
integral(-(b*log(c*x) + a)/(e*x^2 - 1), x)
```

3.245.6 Sympy [F]

$$\int \frac{a + b\log(cx)}{1 - ex^2}\,dx = -\int \frac{a}{ex^2 - 1}\,dx - \int \frac{b\log{(cx)}}{ex^2 - 1}\,dx$$

input
```
integrate((a+b*ln(c*x))/(-e*x**2+1),x)
```

output
```
-Integral(a/(e*x**2 - 1), x) - Integral(b*log(c*x)/(e*x**2 - 1), x)
```

3.245.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx)}{1 - ex^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x))/(-e*x^2+1),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.245.8 Giac [F]

$$\int \frac{a + b\log(cx)}{1 - ex^2}\,dx = \int -\frac{b\log{(cx)} + a}{ex^2 - 1}\,dx$$

input
```
integrate((a+b*log(c*x))/(-e*x^2+1),x, algorithm="giac")
```

output
```
integrate(-(b*log(c*x) + a)/(e*x^2 - 1), x)
```

3.245.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx)}{1-ex^2}\,dx=\int -\frac{a+b\,\ln\left(c\,x\right)}{e\,x^2-1}\,dx$$

input
```
int(-(a + b*log(c*x))/(e*x^2 - 1),x)
```

output
```
int(-(a + b*log(c*x))/(e*x^2 - 1), x)
```

3.246 $\int \frac{a+b\log(cx^n)}{1-ex^2} dx$

3.246.1 Optimal result

Integrand size = 21, antiderivative size = 66

$$\int \frac{a+b\log(cx^n)}{1-ex^2} dx = \frac{\operatorname{arctanh}(\sqrt{e}x)(a+b\log(cx^n))}{\sqrt{e}} + \frac{bn\operatorname{PolyLog}(2,-\sqrt{e}x)}{2\sqrt{e}} - \frac{bn\operatorname{PolyLog}(2,\sqrt{e}x)}{2\sqrt{e}}$$

output
```
arctanh(x*e^(1/2))*(a+b*ln(c*x^n))/e^(1/2)+1/2*b*n*polylog(2,-x*e^(1/2))/e
^(1/2)-1/2*b*n*polylog(2,x*e^(1/2))/e^(1/2)
```

3.246.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{1-ex^2} dx = \frac{-((a+b\log(cx^n))(\log(1-\sqrt{e}x)-\log(1+\sqrt{e}x)))+bn\operatorname{PolyLog}(2,-\sqrt{e}x)-bn\operatorname{PolyLog}(2,\sqrt{e}x)}{2\sqrt{e}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(1 - e*x^2),x]
```

output
```
(-((a + b*Log[c*x^n])*(Log[1 - Sqrt[e]*x] - Log[1 + Sqrt[e]*x])) + b*n*Pol
yLog[2, -(Sqrt[e]*x)] - b*n*PolyLog[2, Sqrt[e]*x])/(2*Sqrt[e])
```

3.246.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 62, normalized size of antiderivative = 0.94, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2761, 27, 6446}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{1-ex^2}\,dx$$

$$\Big\downarrow \ 2761$$

$$\frac{\operatorname{arctanh}(\sqrt{e}x)\,(a+b\log(cx^n))}{\sqrt{e}}-bn\int \frac{\operatorname{arctanh}(\sqrt{e}x)}{\sqrt{e}x}dx$$

$$\Big\downarrow \ 27$$

$$\frac{\operatorname{arctanh}(\sqrt{e}x)\,(a+b\log(cx^n))}{\sqrt{e}}-\frac{bn\int \frac{\operatorname{arctanh}(\sqrt{e}x)}{x}dx}{\sqrt{e}}$$

$$\Big\downarrow \ 6446$$

$$\frac{\operatorname{arctanh}(\sqrt{e}x)\,(a+b\log(cx^n))}{\sqrt{e}}-\frac{bn\left(\frac{\operatorname{PolyLog}(2,\sqrt{e}x)}{2}-\frac{1}{2}\operatorname{PolyLog}\left(2,-\sqrt{e}x\right)\right)}{\sqrt{e}}$$

input
```
Int[(a + b*Log[c*x^n])/(1 - e*x^2),x]
```

output
```
(ArcTanh[Sqrt[e]*x]*(a + b*Log[c*x^n]))/Sqrt[e] - (b*n*(-1/2*PolyLog[2, -(
Sqrt[e]*x)] + PolyLog[2, Sqrt[e]*x]/2))/Sqrt[e]
```

3.246.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2761
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/((d_) + (e_.)*(x_)^2), x_Symbol]
:> With[{u = IntHide[1/(d + e*x^2), x]}, Simp[u*(a + b*Log[c*x^n]), x] - Si
mp[b*n   Int[u/x, x], x]] /; FreeQ[{a, b, c, d, e, n}, x]
```

rule 6446
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))/(x_), x_Symbol] :> Simp[a*Log[x], x
] + (-Simp[(b/2)*PolyLog[2, (-c)*x], x] + Simp[(b/2)*PolyLog[2, c*x], x]) /
; FreeQ[{a, b, c}, x]
```

3.246.4 Maple [C] (verified)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.68 (sec) , antiderivative size = 55, normalized size of antiderivative = 0.83

method	result
meijerg	$\frac{a\,\operatorname{arctanh}\left(x\sqrt{e}\right)}{\sqrt{e}}+\frac{b\ln\left(c\right)\operatorname{arctanh}\left(x\sqrt{e}\right)}{\sqrt{e}}+\left(\frac{bn\ln\left(x\right)\Phi\left(e\,x^{2},1,\frac{1}{2}\right)}{2}-\frac{bn\Phi\left(e\,x^{2},2,\frac{1}{2}\right)}{4}\right)x$
risch	$-\frac{\left(\frac{ib\pi\,\operatorname{csgn}\left(ic\right)\operatorname{csgn}\left(ix^{n}\right)\operatorname{csgn}\left(ic\,x^{n}\right)}{2}-\frac{ib\pi\,\operatorname{csgn}\left(ic\right)\operatorname{csgn}\left(ic\,x^{n}\right)^{2}}{2}-\frac{ib\pi\,\operatorname{csgn}\left(ix^{n}\right)\operatorname{csgn}\left(ic\,x^{n}\right)^{2}}{2}+\frac{ib\pi\,\operatorname{csgn}\left(ic\,x^{n}\right)^{3}}{2}-b\ln\left(c\right)-a\right)\operatorname{arctanh}\left(x\sqrt{e}\right)}{\sqrt{e}}$

input
```
int((a+b*ln(c*x^n))/(-e*x^2+1),x,method=_RETURNVERBOSE)
```

output
```
a/e^(1/2)*arctanh(x*e^(1/2))+b*ln(c)/e^(1/2)*arctanh(x*e^(1/2))+(1/2*b*n*l
n(x)*LerchPhi(e*x^2,1,1/2)-1/4*b*n*LerchPhi(e*x^2,2,1/2))*x
```

3.246.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{1-ex^2}\,dx=\int -\frac{b\log\left(cx^n\right)+a}{ex^2-1}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(-e*x^2+1),x, algorithm="fricas")
```

output
```
integral(-(b*log(c*x^n) + a)/(e*x^2 - 1), x)
```

3.246.6 Sympy [F]

$$\int \frac{a+b\log\left(cx^n\right)}{1-ex^2}\,dx=-\int \frac{a}{ex^2-1}\,dx-\int \frac{b\log\left(cx^n\right)}{ex^2-1}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(-e*x**2+1),x)
```

output
```
-Integral(a/(e*x**2 - 1), x) - Integral(b*log(c*x**n)/(e*x**2 - 1), x)
```

3.246.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^n\right)}{1-ex^2}\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(-e*x^2+1),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.246.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{1-ex^2}\,dx=\int -\frac{b\log\left(cx^n\right)+a}{ex^2-1}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(-e*x^2+1),x, algorithm="giac")
```

output
```
integrate(-(b*log(c*x^n) + a)/(e*x^2 - 1), x)
```

3.246.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{1-ex^2}\,dx=\int -\frac{a+b\,\ln(c\,x^n)}{e\,x^2-1}\,dx$$

input
```
int(-(a + b*log(c*x^n))/(e*x^2 - 1),x)
```

output
```
int(-(a + b*log(c*x^n))/(e*x^2 - 1), x)
```

3.247 $\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx$

3.247.1 Optimal result

Integrand size = 22, antiderivative size = 509

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx &= \frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}x\right)}+\frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}x\right)}\\
&\quad+\frac{bn(a+b\log(cx^n))\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}\\
&\quad-\frac{(a+b\log(cx^n))^2\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}}\\
&\quad-\frac{bn(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}\\
&\quad+\frac{(a+b\log(cx^n))^2\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}}-\frac{b^2n^2\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}\\
&\quad+\frac{bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}\\
&\quad+\frac{b^2n^2\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}-\frac{bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}\\
&\quad-\frac{b^2n^2\operatorname{PolyLog}\left(3,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}+\frac{b^2n^2\operatorname{PolyLog}\left(3,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}\end{aligned}$$

output
```
1/2*b*n*(a+b*ln(c*x^n))*ln(1-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-1/4*
(a+b*ln(c*x^n))^2*ln(1-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-1/2*b*n*(a
+b*ln(c*x^n))*ln(1+x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+1/4*(a+b*ln(c*
x^n))^2*ln(1+x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-1/2*b^2*n^2*polylog(
2,-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+1/2*b*n*(a+b*ln(c*x^n))*polylo
g(2,-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+1/2*b^2*n^2*polylog(2,x*e^(1
/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-1/2*b*n*(a+b*ln(c*x^n))*polylog(2,x*e^(
1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-1/2*b^2*n^2*polylog(3,-x*e^(1/2)/(-d)^
(1/2))/(-d)^(3/2)/e^(1/2)+1/2*b^2*n^2*polylog(3,x*e^(1/2)/(-d)^(1/2))/(-d)
^(3/2)/e^(1/2)+1/4*x*(a+b*ln(c*x^n))^2/(-d)^(3/2)/((-d)^(1/2)-x*e^(1/2))+1
/4*x*(a+b*ln(c*x^n))^2/(-d)^(3/2)/((-d)^(1/2)+x*e^(1/2))
```

3.247.2 Mathematica [A] (verified)

Time = 0.49 (sec) , antiderivative size = 432, normalized size of antiderivative = 0.85

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx$$
$$= \frac{-\frac{(a+b\log(cx^n))^2}{d(\sqrt{-d}-\sqrt{e}x)}+\frac{(a+b\log(cx^n))^2}{d(\sqrt{-d}+\sqrt{e}x)}-\frac{2bn(a+b\log(cx^n))\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{3/2}}+\frac{(a+b\log(cx^n))^2\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{(-d)^{3/2}}+\frac{2bn(a+b\log(cx^n))\log\left(1+\right.}{(-d)^{3/2}}}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(d + e*x^2)^2,x]
```

output
```
(-((a + b*Log[c*x^n])^2/(d*(Sqrt[-d] - Sqrt[e]*x))) + (a + b*Log[c*x^n])^2
/(d*(Sqrt[-d] + Sqrt[e]*x)) - (2*b*n*(a + b*Log[c*x^n])*Log[1 + (Sqrt[e]*x
)/Sqrt[-d]])/(-d)^(3/2) + ((a + b*Log[c*x^n])^2*Log[1 + (Sqrt[e]*x)/Sqrt[-
d]])/(-d)^(3/2) + (2*b*n*(a + b*Log[c*x^n])*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/
2)])/(-d)^(3/2) + (d*(a + b*Log[c*x^n])^2*Log[1 + (d*Sqrt[e]*x)/(-d)^(3/2)
])/(-d)^(5/2) + (2*b^2*n^2*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3/2) -
(2*b*n*(a + b*Log[c*x^n])*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3/2) - (
2*b^2*n^2*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(3/2) + (2*b*n*(a + b
*Log[c*x^n])*PolyLog[2, (d*Sqrt[e]*x)/(-d)^(3/2)])/(-d)^(3/2) + (2*b^2*n^2
*PolyLog[3, (Sqrt[e]*x)/Sqrt[-d]])/(-d)^(3/2) - (2*b^2*n^2*PolyLog[3, (d*S
qrt[e]*x)/(-d)^(3/2)])/(-d)^(3/2))/(4*Sqrt[e])
```

3.247.3 Rubi [A] (verified)

Time = 0.85 (sec) , antiderivative size = 509, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(-\frac{e(a+b\log(cx^n))^2}{2d(-de-e^2x^2)}-\frac{e(a+b\log(cx^n))^2}{4d\left(\sqrt{-d}\sqrt{e}-ex\right)^2}-\frac{e(a+b\log(cx^n))^2}{4d\left(\sqrt{-d}\sqrt{e}+ex\right)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\,\text{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}-\frac{bn\,\text{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}+\frac{bn\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}-\frac{bn\log\left(\frac{\sqrt{e}x}{\sqrt{-d}}+1\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}+\frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}x\right)}+\frac{x(a+b\log(cx^n))^2}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}x\right)}-\frac{\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}+\frac{\log\left(\frac{\sqrt{e}x}{\sqrt{-d}}+1\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}-\frac{b^2n^2\,\text{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}+\frac{b^2n^2\,\text{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}-\frac{b^2n^2\,\text{PolyLog}\left(3,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}+\frac{b^2n^2\,\text{PolyLog}\left(3,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}$$

input
```
Int[(a + b*Log[c*x^n])^2/(d + e*x^2)^2,x]
```

output
```
(x*(a + b*Log[c*x^n])^2)/(4*(-d)^(3/2)*(Sqrt[-d] - Sqrt[e]*x)) + (x*(a + b
*Log[c*x^n])^2)/(4*(-d)^(3/2)*(Sqrt[-d] + Sqrt[e]*x)) + (b*n*(a + b*Log[c*
x^n])*Log[1 - (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e]) - ((a + b*Log[
c*x^n])^2*Log[1 - (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) - (b*n*(a
+ b*Log[c*x^n])*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e]) + ((
a + b*Log[c*x^n])^2*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e])
- (b^2*n^2*PolyLog[2, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*Sqrt[e]) + (
b*n*(a + b*Log[c*x^n])*PolyLog[2, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*
Sqrt[e]) + (b^2*n^2*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e
]) - (b*n*(a + b*Log[c*x^n])*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/
2)*Sqrt[e]) - (b^2*n^2*PolyLog[3, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*
Sqrt[e]) + (b^2*n^2*PolyLog[3, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e
])
```

3.247.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

3.247.4 Maple [F]

$$\int \frac{(a+b\ln(c\,x^n))^2}{(e\,x^2+d)^2}dx$$

input
```
int((a+b*ln(c*x^n))^2/(e*x^2+d)^2,x)
```

output
```
int((a+b*ln(c*x^n))^2/(e*x^2+d)^2,x)
```

3.247.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^2+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^2*x^4 + 2*d*e*x^2
+ d^2), x)
```

3.247.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx = \int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/(e*x**2+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(d + e*x**2)**2, x)
```

3.247.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^2)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.247.8 Giac [F]

$$\int \frac{(a+b\log{(cx^n)})^2}{(d+ex^2)^2}\,dx = \int \frac{(b\log{(cx^n)}+a)^2}{(ex^2+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/(e*x^2 + d)^2, x)
```

3.247.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log{(cx^n)})^2}{(d+ex^2)^2}\,dx = \int \frac{(a+b\,\ln{(c\,x^n)})^2}{(e\,x^2+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(d + e*x^2)^2,x)
```

output
```
int((a + b*log(c*x^n))^2/(d + e*x^2)^2, x)
```

3.248 $\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx$

3.248.1 Optimal result

Integrand size = 22, antiderivative size = 711

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx = \frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}x\right)} + \frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}x\right)}$$
$$+ \frac{3bn(a+b\log(cx^n))^2\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}}$$
$$- \frac{(a+b\log(cx^n))^3\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}}$$
$$- \frac{3bn(a+b\log(cx^n))^2\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}}$$
$$+ \frac{(a+b\log(cx^n))^3\log\left(1+\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}}$$
$$- \frac{3b^2n^2(a+b\log(cx^n))\,\text{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}$$
$$+ \frac{3bn(a+b\log(cx^n))^2\,\text{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}}$$
$$+ \frac{3b^2n^2(a+b\log(cx^n))\,\text{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}$$
$$- \frac{3bn(a+b\log(cx^n))^2\,\text{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{4(-d)^{3/2}\sqrt{e}}$$
$$+ \frac{3b^3n^3\,\text{PolyLog}\left(3,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}$$
$$- \frac{3b^2n^2(a+b\log(cx^n))\,\text{PolyLog}\left(3,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}$$
$$- \frac{3b^3n^3\,\text{PolyLog}\left(3,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}$$
$$+ \frac{3b^2n^2(a+b\log(cx^n))\,\text{PolyLog}\left(3,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}$$
$$+ \frac{3b^3n^3\,\text{PolyLog}\left(4,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}} - \frac{3b^3n^3\,\text{PolyLog}\left(4,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}$$

output
```
3/4*b*n*(a+b*ln(c*x^n))^2*ln(1-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-1/
4*(a+b*ln(c*x^n))^3*ln(1-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/4*b*n*
(a+b*ln(c*x^n))^2*ln(1+x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+1/4*(a+b*l
n(c*x^n))^3*ln(1+x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/2*b^2*n^2*(a+b
*ln(c*x^n))*polylog(2,-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/4*b*n*(a
+b*ln(c*x^n))^2*polylog(2,-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/2*b^
2*n^2*(a+b*ln(c*x^n))*polylog(2,x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3
/4*b*n*(a+b*ln(c*x^n))^2*polylog(2,x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2
)+3/2*b^3*n^3*polylog(3,-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/2*b^2*
n^2*(a+b*ln(c*x^n))*polylog(3,-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/
2*b^3*n^3*polylog(3,x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/2*b^2*n^2*(
a+b*ln(c*x^n))*polylog(3,x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+3/2*b^3*
n^3*polylog(4,-x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)-3/2*b^3*n^3*polylo
g(4,x*e^(1/2)/(-d)^(1/2))/(-d)^(3/2)/e^(1/2)+1/4*x*(a+b*ln(c*x^n))^3/(-d)^
(3/2)/((-d)^(1/2)-x*e^(1/2))+1/4*x*(a+b*ln(c*x^n))^3/(-d)^(3/2)/((-d)^(1/2
)+x*e^(1/2))
```

3.248.2 Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 2.91 (sec) , antiderivative size = 1073, normalized size of antiderivative = 1.51

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx$$

$$= \frac{\frac{2\sqrt{d}x(a-bn\log(x)+b\log(cx^n))^3}{d+ex^2} + \frac{2\arctan\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a-bn\log(x)+b\log(cx^n))^3}{\sqrt{e}} + 3bn(a-bn\log(x)+b\log(cx^n))^2\left(\frac{\sqrt{e}x\log(x)+\cdots}{\cdots}\right.}{\cdots}$$

input
```
Integrate[(a + b*Log[c*x^n])^3/(d + e*x^2)^2,x]
```

output
```
((2*Sqrt[d]*x*(a - b*n*Log[x] + b*Log[c*x^n])^3)/(d + e*x^2) + (2*ArcTan[(
Sqrt[e]*x)/Sqrt[d]]*(a - b*n*Log[x] + b*Log[c*x^n])^3)/Sqrt[e] + 3*b*n*(a
- b*n*Log[x] + b*Log[c*x^n])^2*((Sqrt[e]*x*Log[x] + I*(Sqrt[d] + I*Sqrt[e]
*x)*Log[I*Sqrt[d] - Sqrt[e]*x])/(Sqrt[d]*Sqrt[e] + I*e*x) + (Sqrt[e]*x*Log
[x] + ((-I)*Sqrt[d] - Sqrt[e]*x)*Log[I*Sqrt[d] + Sqrt[e]*x])/(Sqrt[d]*Sqrt
[e] - I*e*x) - (I*(Log[x]*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + PolyLog[2, ((-I
)*Sqrt[e]*x)/Sqrt[d]]))/Sqrt[e] + (I*(Log[x]*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]
] + PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]]))/Sqrt[e]) + 3*b^2*n^2*(a - b*n*Log[
x] + b*Log[c*x^n])*((Log[x]*(Sqrt[e]*x*Log[x] + (2*I)*(Sqrt[d] + I*Sqrt[e]
*x)*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]]) + (2*I)*(Sqrt[d] + I*Sqrt[e]*x)*PolyLo
g[2, ((-I)*Sqrt[e]*x)/Sqrt[d]])/(Sqrt[d]*Sqrt[e] + I*e*x) + (Log[x]*(Sqrt[
e]*x*Log[x] - (2*I)*(Sqrt[d] - I*Sqrt[e]*x)*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]]
) - 2*(I*Sqrt[d] + Sqrt[e]*x)*PolyLog[2, (I*Sqrt[e]*x)/Sqrt[d]])/(Sqrt[d]*
Sqrt[e] - I*e*x) - (I*(Log[x]^2*Log[1 + (I*Sqrt[e]*x)/Sqrt[d]] + 2*Log[x]*
PolyLog[2, ((-I)*Sqrt[e]*x)/Sqrt[d]] - 2*PolyLog[3, ((-I)*Sqrt[e]*x)/Sqrt[
d]]))/Sqrt[e] + (I*(Log[x]^2*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 2*Log[x]*Pol
yLog[2, (I*Sqrt[e]*x)/Sqrt[d]] - 2*PolyLog[3, (I*Sqrt[e]*x)/Sqrt[d]]))/Sqr
t[e]) + (I*b^3*n^3*(-Log[x]^3 + (Sqrt[d]*Log[x]^3)/(Sqrt[d] + I*Sqrt[e]*x)
 + (Sqrt[e]*x*Log[x]^3)/(I*Sqrt[d] + Sqrt[e]*x) - 3*Log[x]^2*Log[1 - (I*Sq
rt[e]*x)/Sqrt[d]] + Log[x]^3*Log[1 - (I*Sqrt[e]*x)/Sqrt[d]] + 3*Log[x]^...
```

3.248.3 Rubi [A] (verified)

Time = 1.10 (sec) , antiderivative size = 711, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(-\frac{e(a+b\log(cx^n))^3}{2d(-de-e^2x^2)}-\frac{e(a+b\log(cx^n))^3}{4d\left(\sqrt{-d}\sqrt{e}-ex\right)^2}-\frac{e(a+b\log(cx^n))^3}{4d\left(\sqrt{-d}\sqrt{e}+ex\right)^2}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{3b^2n^2\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}+\frac{3b^2n^2\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}-\frac{3b^2n^2\operatorname{PolyLog}\left(3,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}+\frac{3b^2n^2\operatorname{PolyLog}\left(3,\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))}{2(-d)^{3/2}\sqrt{e}}+\frac{3bn\operatorname{PolyLog}\left(2,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}-\frac{3bn\operatorname{PolyLog}\left(2,\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}+\frac{3bn\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}-\frac{3bn\log\left(\frac{\sqrt{e}x}{\sqrt{-d}}+1\right)(a+b\log(cx^n))^2}{4(-d)^{3/2}\sqrt{e}}+\frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}-\sqrt{e}x\right)}+\frac{x(a+b\log(cx^n))^3}{4(-d)^{3/2}\left(\sqrt{-d}+\sqrt{e}x\right)}-\frac{\log\left(1-\frac{\sqrt{e}x}{\sqrt{-d}}\right)(a+b\log(cx^n))^3}{4(-d)^{3/2}\sqrt{e}}+\frac{\log\left(\frac{\sqrt{e}x}{\sqrt{-d}}+1\right)(a+b\log(cx^n))^3}{4(-d)^{3/2}\sqrt{e}}+\frac{3b^3n^3\operatorname{PolyLog}\left(3,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}-\frac{3b^3n^3\operatorname{PolyLog}\left(3,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}+\frac{3b^3n^3\operatorname{PolyLog}\left(4,-\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}-\frac{3b^3n^3\operatorname{PolyLog}\left(4,\frac{\sqrt{e}x}{\sqrt{-d}}\right)}{2(-d)^{3/2}\sqrt{e}}$$

input
```
Int[(a + b*Log[c*x^n])^3/(d + e*x^2)^2,x]
```

output
```
(x*(a + b*Log[c*x^n])^3)/(4*(-d)^(3/2)*(Sqrt[-d] - Sqrt[e]*x)) + (x*(a + b
*Log[c*x^n])^3)/(4*(-d)^(3/2)*(Sqrt[-d] + Sqrt[e]*x)) + (3*b*n*(a + b*Log[
c*x^n])^2*Log[1 - (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) - ((a + b*
Log[c*x^n])^3*Log[1 - (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) - (3*b
*n*(a + b*Log[c*x^n])^2*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[
e]) + ((a + b*Log[c*x^n])^3*Log[1 + (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*S
qrt[e]) - (3*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[2, -((Sqrt[e]*x)/Sqrt[-d])
])/(2*(-d)^(3/2)*Sqrt[e]) + (3*b*n*(a + b*Log[c*x^n])^2*PolyLog[2, -((Sqrt
[e]*x)/Sqrt[-d])])/(4*(-d)^(3/2)*Sqrt[e]) + (3*b^2*n^2*(a + b*Log[c*x^n])*
PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*Sqrt[e]) - (3*b*n*(a + b*L
og[c*x^n])^2*PolyLog[2, (Sqrt[e]*x)/Sqrt[-d]])/(4*(-d)^(3/2)*Sqrt[e]) + (3
*b^3*n^3*PolyLog[3, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3/2)*Sqrt[e]) - (3*
b^2*n^2*(a + b*Log[c*x^n])*PolyLog[3, -((Sqrt[e]*x)/Sqrt[-d])])/(2*(-d)^(3
/2)*Sqrt[e]) - (3*b^3*n^3*PolyLog[3, (Sqrt[e]*x)/Sqrt[-d]])/(2*(-d)^(3/2)*
Sqrt[e]) + (3*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[3, (Sqrt[e]*x)/Sqrt[-d]])
/(2*(-d)^(3/2)*Sqrt[e]) + (3*b^3*n^3*PolyLog[4, -((Sqrt[e]*x)/Sqrt[-d])])/
(2*(-d)^(3/2)*Sqrt[e]) - (3*b^3*n^3*PolyLog[4, (Sqrt[e]*x)/Sqrt[-d]])/(2*(
-d)^(3/2)*Sqrt[e])
```

3.248. $\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx$

3.248.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

3.248.4 Maple [F]

$$\int \frac{(a+b\ln(c\,x^n))^3}{(e\,x^2+d)^2}dx$$

input
```
int((a+b*ln(c*x^n))^3/(e*x^2+d)^2,x)
```

output
```
int((a+b*ln(c*x^n))^3/(e*x^2+d)^2,x)
```

3.248.5 Fricas [F]

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex^2+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a
^3)/(e^2*x^4 + 2*d*e*x^2 + d^2), x)
```

3.248.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx = \int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**3/(e*x**2+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**3/(d + e*x**2)**2, x)
```

3.248.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))^3/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.248.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex^2+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^3/(e*x^2 + d)^2, x)
```

3.248.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^2)^2}\,dx=\int \frac{(a+b\,\ln(c\,x^n))^3}{(e\,x^2+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^3/(d + e*x^2)^2,x)
```

output
```
int((a + b*log(c*x^n))^3/(d + e*x^2)^2, x)
```

3.249 $\int \frac{1}{(d+ex^2)^2(a+b\log(cx^n))}\,dx$

3.249.1 Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))}\,dx = \text{Int}\left(\frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))},x\right)$$

output
```
Unintegrable(1/(e*x^2+d)^2/(a+b*ln(c*x^n)),x)
```

3.249.2 Mathematica [N/A]

Not integrable

Time = 2.38 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))}\,dx = \int \frac{1}{(d+ex^2)^2\,(a+b\log(cx^n))}\,dx$$

input
```
Integrate[1/((d + e*x^2)^2*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[1/((d + e*x^2)^2*(a + b*Log[c*x^n])), x]
```

3.249.3 Rubi [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))} \, dx$$
$$\Big\downarrow \; 2768$$
$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))} dx$$

input
```
Int[1/((d + e*x^2)^2*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

3.249.3.1 Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

3.249.4 Maple [N/A]

Not integrable

Time = 0.00 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(e\,x^2+d)^2 (a+b\ln(c\,x^n))} dx$$

input
```
int(1/(e*x^2+d)^2/(a+b*ln(c*x^n)),x)
```

output
```
int(1/(e*x^2+d)^2/(a+b*ln(c*x^n)),x)
```

3.249.5 Fricas [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.50

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))} dx = \int \frac{1}{(ex^2+d)^2 (b\log(cx^n)+a)} dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(1/(a*e^2*x^4 + 2*a*d*e*x^2 + a*d^2 + (b*e^2*x^4 + 2*b*d*e*x^2 + b
*d^2)*log(c*x^n)), x)
```

3.249.6 Sympy [N/A]

Not integrable

Time = 77.41 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.91

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))} dx = \int \frac{1}{(a+b\log(cx^n))(d+ex^2)^2} dx$$

input
```
integrate(1/(e*x**2+d)**2/(a+b*ln(c*x**n)),x)
```

output
```
Integral(1/((a + b*log(c*x**n))*(d + e*x**2)**2), x)
```

3.249.7 Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))} dx = \int \frac{1}{(ex^2+d)^2 (b\log(cx^n)+a)} dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x^2 + d)^2*(b*log(c*x^n) + a)), x)
```

3.249.8 Giac [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{\left(ex^2+d\right)^2\left(b\log\left(cx^n\right)+a\right)}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)^2*(b*log(c*x^n) + a)), x)
```

3.249.9 Mupad [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)}\,dx=\int \frac{1}{{\left(e\,x^2+d\right)}^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)}\,dx$$

input
```
int(1/((d + e*x^2)^2*(a + b*log(c*x^n))),x)
```

output
```
int(1/((d + e*x^2)^2*(a + b*log(c*x^n))), x)
```

3.250 $\int \frac{1}{\left(d+ex^2\right)^2(a+b\log(cx^n))^2}\,dx$

3.250.1 Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)^2}\,dx=\text{Int}\left(\frac{1}{\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)^2},x\right)$$

output
```
Unintegrable(1/(e*x^2+d)^2/(a+b*ln(c*x^n))^2,x)
```

3.250.2 Mathematica [N/A]

Not integrable

Time = 10.34 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)^2}\,dx=\int \frac{1}{\left(d+ex^2\right)^2\left(a+b\log\left(cx^n\right)\right)^2}\,dx$$

input
```
Integrate[1/((d + e*x^2)^2*(a + b*Log[c*x^n])^2),x]
```

output
```
Integrate[1/((d + e*x^2)^2*(a + b*Log[c*x^n])^2), x]
```

3.250.3 Rubi [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2} dx$$
$$\Big\downarrow 2768$$
$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2} dx$$

input
```
Int[1/((d + e*x^2)^2*(a + b*Log[c*x^n])^2),x]
```

output
```
$Aborted
```

3.250.3.1 Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

3.250.4 Maple [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(e\,x^2+d)^2 (a+b\ln(c\,x^n))^2}dx$$

input
```
int(1/(e*x^2+d)^2/(a+b*ln(c*x^n))^2,x)
```

output
```
int(1/(e*x^2+d)^2/(a+b*ln(c*x^n))^2,x)
```

3.250.5 Fricas [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 102, normalized size of antiderivative = 4.64

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2}\,dx = \int \frac{1}{(ex^2+d)^2(b\log(cx^n)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
integral(1/(a^2*e^2*x^4 + 2*a^2*d*e*x^2 + a^2*d^2 + (b^2*e^2*x^4 + 2*b^2*d
*e*x^2 + b^2*d^2)*log(c*x^n)^2 + 2*(a*b*e^2*x^4 + 2*a*b*d*e*x^2 + a*b*d^2)
*log(c*x^n)), x)
```

3.250.6 Sympy [N/A]

Not integrable

Time = 0.00 (sec) , antiderivative size = 1, normalized size of antiderivative = 0.05

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2}\,dx = \int \frac{1}{(a+b\log(cx^n))^2 (d+ex^2)^2}\,dx$$

input
```
integrate(1/(e*x**2+d)**2/(a+b*ln(c*x**n))**2,x)
```

output
```
integrate(1/(e*x**2+d)**2/(a+b*ln(c*x**n))**2,x)
```

3.250.7 Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 261, normalized size of antiderivative = 11.86

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2}\,dx = \int \frac{1}{(ex^2+d)^2(b\log(cx^n)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
-x/(b^2*d^2*n*log(c) + a*b*d^2*n + (b^2*e^2*n*log(c) + a*b*e^2*n)*x^4 + 2*
(b^2*d*e*n*log(c) + a*b*d*e*n)*x^2 + (b^2*e^2*n*x^4 + 2*b^2*d*e*n*x^2 + b^
2*d^2*n)*log(x^n)) - integrate((3*e*x^2 - d)/((b^2*e^3*n*log(c) + a*b*e^3*
n)*x^6 + b^2*d^3*n*log(c) + a*b*d^3*n + 3*(b^2*d*e^2*n*log(c) + a*b*d*e^2*
n)*x^4 + 3*(b^2*d^2*e*n*log(c) + a*b*d^2*e*n)*x^2 + (b^2*e^3*n*x^6 + 3*b^2
*d*e^2*n*x^4 + 3*b^2*d^2*e*n*x^2 + b^2*d^3*n)*log(x^n)), x)
```

3.250.8 Giac [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2}\,dx = \int \frac{1}{(ex^2+d)^2(b\log(cx^n)+a)^2}\,dx$$

input
```
integrate(1/(e*x^2+d)^2/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
integrate(1/((e*x^2 + d)^2*(b*log(c*x^n) + a)^2), x)
```

3.250.9 Mupad [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^2)^2 (a+b\log(cx^n))^2}\,dx = \int \frac{1}{(e\,x^2+d)^2\,(a+b\,\ln(c\,x^n))^2}\,dx$$

input
```
int(1/((d + e*x^2)^2*(a + b*log(c*x^n))^2),x)
```

output
```
int(1/((d + e*x^2)^2*(a + b*log(c*x^n))^2), x)
```

3.251 $\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

3.251.1 Optimal result

Integrand size = 25, antiderivative size = 208

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = -\frac{8bd^3n\sqrt{d+ex^2}}{105e^3}-\frac{8bd^2n(d+ex^2)^{3/2}}{315e^3}+\frac{9bdn(d+ex^2)^{5/2}}{175e^3}-\frac{bn(d+ex^2)^{7/2}}{49e^3}+\frac{8bd^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{105e^3}+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}$$

output
```
-8/315*b*d^2*n*(e*x^2+d)^(3/2)/e^3+9/175*b*d*n*(e*x^2+d)^(5/2)/e^3-1/49*b*
n*(e*x^2+d)^(7/2)/e^3+8/105*b*d^(7/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e
^3+1/3*d^2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/e^3-2/5*d*(e*x^2+d)^(5/2)*(a+b*
ln(c*x^n))/e^3+1/7*(e*x^2+d)^(7/2)*(a+b*ln(c*x^n))/e^3-8/105*b*d^3*n*(e*x^
2+d)^(1/2)/e^3
```

3.251.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 251, normalized size of antiderivative = 1.21

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = -\frac{8bd^{7/2}n\log(x)}{105e^3} + \frac{bn\sqrt{d+ex^2}(8d^3-4d^2ex^2+3de^2x^4+15e^3x^6)\log(x)}{105e^3} + \sqrt{d+ex^2}\left(\frac{1}{49}x^6(7a-bn+7b(-n\log(x)+\log(cx^n))) + \frac{dx^4(35a-12bn+35b(-n\log(x)+\log(cx^n)))}{1225e} + \frac{2d^3(420a-389bn+420b(-n\log(x)+\log(cx^n)))}{11025e^3} - \frac{d^2x^2(420a-179bn+420b(-n\log(x)+\log(cx^n)))}{11025e^2}\right) + \frac{8bd^{7/2}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{105e^3}$$

input
```
Integrate[x^5*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(-8*b*d^(7/2)*n*Log[x])/(105*e^3) + (b*n*Sqrt[d + e*x^2]*(8*d^3 - 4*d^2*e*
x^2 + 3*d*e^2*x^4 + 15*e^3*x^6)*Log[x])/(105*e^3) + Sqrt[d + e*x^2]*((x^6*
(7*a - b*n + 7*b*(-(n*Log[x]) + Log[c*x^n])))/49 + (d*x^4*(35*a - 12*b*n +
 35*b*(-(n*Log[x]) + Log[c*x^n])))/(1225*e) + (2*d^3*(420*a - 389*b*n + 42
0*b*(-(n*Log[x]) + Log[c*x^n])))/(11025*e^3) - (d^2*x^2*(420*a - 179*b*n +
 420*b*(-(n*Log[x]) + Log[c*x^n])))/(11025*e^2)) + (8*b*d^(7/2)*n*Log[d +
Sqrt[d]*Sqrt[d + e*x^2]])/(105*e^3)
```

3.251.3 Rubi [A] (warning: unable to verify)

Time = 0.50 (sec) , antiderivative size = 180, normalized size of antiderivative = 0.87, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.280, Rules used = {2792, 27, 1578, 1192, 25, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \ 2792$$

$$-bn\int \frac{(ex^2+d)^{3/2}(15e^2x^4-12dex^2+8d^2)}{105e^3x}dx+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \ 27$$

$$-\frac{bn\int \frac{(ex^2+d)^{3/2}(15e^2x^4-12dex^2+8d^2)}{x}dx}{105e^3}+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \ 1578$$

$$-\frac{bn\int \frac{(ex^2+d)^{3/2}(15e^2x^4-12dex^2+8d^2)}{x^2}dx^2}{210e^3}+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \ 1192$$

$$-\frac{bn\int -\frac{x^8(15e^2x^8-42de^2x^4+35d^2e^2)}{d-x^4}d\sqrt{ex^2+d}}{105e^5}+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \ 25$$

$$\frac{bn\int \frac{x^8(15e^2x^8-42de^2x^4+35d^2e^2)}{d-x^4}d\sqrt{ex^2+d}}{105e^5}+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \ 1584$$

$$\frac{bn\int \left(-15e^2x^{12}+27de^2x^8-8d^2e^2x^4-8d^3e^2+\frac{8d^4e^2}{d-x^4}\right)d\sqrt{ex^2+d}}{105e^5}+\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

$$\Big\downarrow \ 2009$$

$$\frac{d^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{2d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{bn\left(-8d^{7/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+8d^3e^2\sqrt{d+ex^2}+\frac{8}{3}d^2e^2x^6-\frac{27}{5}de^2x^{10}+\frac{15e^2x^{14}}{7}\right)}{105e^5}$$

3.251. $\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

input
```
Int[x^5*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
-1/105*(b*n*((8*d^2*e^2*x^6)/3 - (27*d*e^2*x^10)/5 + (15*e^2*x^14)/7 + 8*d
^3*e^2*Sqrt[d + e*x^2] - 8*d^(7/2)*e^2*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]))/
e^5 + (d^2*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^3) - (2*d*(d + e*x^2
)^(5/2)*(a + b*Log[c*x^n]))/(5*e^3) + ((d + e*x^2)^(7/2)*(a + b*Log[c*x^n]
))/(7*e^3)
```

3.251.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1578
```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a
+ b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Int
egerQ[(m - 1)/2]
```

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.251.4 Maple [F]

$$\int x^5(a+b\ln(c\,x^n))\sqrt{e\,x^2+d}dx$$

input
```
int(x^5*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

output
```
int(x^5*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

3.251.5 Fricas [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 414, normalized size of antiderivative = 1.99

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\ dx$$

$$= \left[\frac{420\,bd^{\frac{7}{2}}n\log\left(-\frac{ex^2+2\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(225\,(be^3n-7\,ae^3)x^6+778\,bd^3n+9\,(12\,bde^2n-35\,ade^2)x^4-840\ldots}{\ldots}\right.$$

$$-\frac{840\,b\sqrt{-d}d^3n\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex^2+d}}\right)+(225\,(be^3n-7\,ae^3)x^6+778\,bd^3n+9\,(12\,bde^2n-35\,ade^2)x^4-840\,a\ldots}{\ldots}$$

input
```
integrate(x^5*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/11025*(420*b*d^(7/2)*n*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x
^2) - (225*(b*e^3*n - 7*a*e^3)*x^6 + 778*b*d^3*n + 9*(12*b*d*e^2*n - 35*a*
d*e^2)*x^4 - 840*a*d^3 - (179*b*d^2*e*n - 420*a*d^2*e)*x^2 - 105*(15*b*e^3
*x^6 + 3*b*d*e^2*x^4 - 4*b*d^2*e*x^2 + 8*b*d^3)*log(c) - 105*(15*b*e^3*n*x
^6 + 3*b*d*e^2*n*x^4 - 4*b*d^2*e*n*x^2 + 8*b*d^3*n)*log(x))*sqrt(e*x^2 + d
))/e^3, -1/11025*(840*b*sqrt(-d)*d^3*n*arctan(sqrt(-d)/sqrt(e*x^2 + d)) +
(225*(b*e^3*n - 7*a*e^3)*x^6 + 778*b*d^3*n + 9*(12*b*d*e^2*n - 35*a*d*e^2)
*x^4 - 840*a*d^3 - (179*b*d^2*e*n - 420*a*d^2*e)*x^2 - 105*(15*b*e^3*x^6 +
 3*b*d*e^2*x^4 - 4*b*d^2*e*x^2 + 8*b*d^3)*log(c) - 105*(15*b*e^3*n*x^6 + 3
*b*d*e^2*n*x^4 - 4*b*d^2*e*n*x^2 + 8*b*d^3*n)*log(x))*sqrt(e*x^2 + d))/e^3
]
```

3.251.6 Sympy [A] (verification not implemented)

Time = 20.89 (sec) , antiderivative size = 490, normalized size of antiderivative = 2.36

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$= a\left(\begin{cases}\frac{8d^3\sqrt{d+ex^2}}{105e^3}-\frac{4d^2x^2\sqrt{d+ex^2}}{105e^2}+\frac{dx^4\sqrt{d+ex^2}}{35e}+\frac{x^6\sqrt{d+ex^2}}{7} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^6}{6} & \text{otherwise}\end{cases}\right)$$

$$-bn\left(\begin{cases}-\frac{8d^{\frac{7}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{105e^3}+\frac{8d^4}{105e^{\frac{7}{2}}x\sqrt{\frac{d}{ex^2}+1}}+\frac{8d^3x}{105e^{\frac{5}{2}}\sqrt{\frac{d}{ex^2}+1}}-\frac{4d^2\left(\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)}{105e^2}+\frac{d\left(\left\{-\right.\right.}{} \\ \frac{\sqrt{d}x^6}{36}\end{cases}\right.$$

$$+b\left(\begin{cases}\frac{8d^3\sqrt{d+ex^2}}{105e^3}-\frac{4d^2x^2\sqrt{d+ex^2}}{105e^2}+\frac{dx^4\sqrt{d+ex^2}}{35e}+\frac{x^6\sqrt{d+ex^2}}{7} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^6}{6} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**5*(a+b*ln(c*x**n))*(e*x**2+d)**(1/2),x)
```

output
```
a*Piecewise((8*d**3*sqrt(d + e*x**2)/(105*e**3) - 4*d**2*x**2*sqrt(d + e*x
**2)/(105*e**2) + d*x**4*sqrt(d + e*x**2)/(35*e) + x**6*sqrt(d + e*x**2)/7
, Ne(e, 0)), (sqrt(d)*x**6/6, True)) - b*n*Piecewise((-8*d**(7/2)*asinh(sq
rt(d)/(sqrt(e)*x))/(105*e**3) + 8*d**4/(105*e**(7/2)*x*sqrt(d/(e*x**2) + 1
)) + 8*d**3*x/(105*e**(5/2)*sqrt(d/(e*x**2) + 1)) - 4*d**2*Piecewise((d*sq
rt(d + e*x**2)/(3*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2
, True))/(105*e**2) + d*Piecewise((-2*d**2*sqrt(d + e*x**2)/(15*e**2) + d*
x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt(d
)*x**4/4, True))/(35*e) + Piecewise((8*d**3*sqrt(d + e*x**2)/(105*e**3) -
4*d**2*x**2*sqrt(d + e*x**2)/(105*e**2) + d*x**4*sqrt(d + e*x**2)/(35*e) +
 x**6*sqrt(d + e*x**2)/7, Ne(e, 0)), (sqrt(d)*x**6/6, True))/7, (e > -oo)
& (e < oo) & Ne(e, 0)), (sqrt(d)*x**6/36, True)) + b*Piecewise((8*d**3*sqr
t(d + e*x**2)/(105*e**3) - 4*d**2*x**2*sqrt(d + e*x**2)/(105*e**2) + d*x**
4*sqrt(d + e*x**2)/(35*e) + x**6*sqrt(d + e*x**2)/7, Ne(e, 0)), (sqrt(d)*x
**6/6, True))*log(c*x**n)
```

3.251.7 Maxima [F(-2)]

Exception generated.

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^5*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.251.8 Giac [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 288, normalized size of antiderivative = 1.38

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \frac{1}{7}\sqrt{ex^2+d}bx^6\log(c)+\frac{1}{7}\sqrt{ex^2+d}ax^6 + \frac{\sqrt{ex^2+d}bdx^4\log(c)}{35\,e}+\frac{\sqrt{ex^2+d}adx^4}{35\,e}-\frac{4\sqrt{ex^2+d}bd^2x^2\log(c)}{105\,e^2}-\frac{4\sqrt{ex^2+d}ad^2x^2}{105\,e^2} + \frac{1}{11025}bn\left(\frac{105\left(15\,(ex^2+d)^{\frac{7}{2}}-42\,(ex^2+d)^{\frac{5}{2}}d+35\,(ex^2+d)^{\frac{3}{2}}d^2\right)\log(x)}{e^3}-\frac{\frac{840\,d^4\arctan\left(\frac{\sqrt{ex^2+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}+225\cdots}{\cdots}\right) + \frac{8\sqrt{ex^2+d}bd^3\log(c)}{105\,e^3}+\frac{8\sqrt{ex^2+d}ad^3}{105\,e^3}$$

input
```
integrate(x^5*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
1/7*sqrt(e*x^2 + d)*b*x^6*log(c) + 1/7*sqrt(e*x^2 + d)*a*x^6 + 1/35*sqrt(e
*x^2 + d)*b*d*x^4*log(c)/e + 1/35*sqrt(e*x^2 + d)*a*d*x^4/e - 4/105*sqrt(e
*x^2 + d)*b*d^2*x^2*log(c)/e^2 - 4/105*sqrt(e*x^2 + d)*a*d^2*x^2/e^2 + 1/1
1025*b*n*(105*(15*(e*x^2 + d)^(7/2) - 42*(e*x^2 + d)^(5/2)*d + 35*(e*x^2 +
 d)^(3/2)*d^2)*log(x)/e^3 - (840*d^4*arctan(sqrt(e*x^2 + d)/sqrt(-d))/sqrt
(-d) + 225*(e*x^2 + d)^(7/2) - 567*(e*x^2 + d)^(5/2)*d + 280*(e*x^2 + d)^(
3/2)*d^2 + 840*sqrt(e*x^2 + d)*d^3)/e^3) + 8/105*sqrt(e*x^2 + d)*b*d^3*log
(c)/e^3 + 8/105*sqrt(e*x^2 + d)*a*d^3/e^3
```

3.251.9 Mupad [F(-1)]

Timed out.

$$\int x^5\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \int x^5\,\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x^5*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^5*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

3.252 $\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

3.252.1 Optimal result

Integrand size = 25, antiderivative size = 154

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\frac{2bd^2n\sqrt{d+ex^2}}{15e^2}+\frac{2bdn(d+ex^2)^{3/2}}{45e^2}-\frac{bn(d+ex^2)^{5/2}}{25e^2}-\frac{2bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{15e^2}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}$$

output
```
2/45*b*d*n*(e*x^2+d)^(3/2)/e^2-1/25*b*n*(e*x^2+d)^(5/2)/e^2-2/15*b*d^(5/2)
*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^2-1/3*d*(e*x^2+d)^(3/2)*(a+b*ln(c*x^
n))/e^2+1/5*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e^2+2/15*b*d^2*n*(e*x^2+d)^(1/
2)/e^2
```

3.252.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 204, normalized size of antiderivative = 1.32

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \frac{2bd^{5/2}n\log(x)}{15e^2} - \frac{bn\sqrt{d+ex^2}(2d^2-dex^2-3e^2x^4)\log(x)}{15e^2} + \sqrt{d+ex^2}\left(\frac{1}{25}x^4(5a-bn+5b(-n\log(x)+\log(cx^n))) + \frac{dx^2(15a-8bn+15b(-n\log(x)+\log(cx^n)))}{225e} - \frac{d^2(30a-31bn+30b(-n\log(x)+\log(cx^n)))}{225e^2}\right) - \frac{2bd^{5/2}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{15e^2}$$

input
```
Integrate[x^3*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(2*b*d^(5/2)*n*Log[x])/(15*e^2) - (b*n*Sqrt[d + e*x^2]*(2*d^2 - d*e*x^2 -
3*e^2*x^4)*Log[x])/(15*e^2) + Sqrt[d + e*x^2]*((x^4*(5*a - b*n + 5*b*(-(n*
Log[x]) + Log[c*x^n])))/25 + (d*x^2*(15*a - 8*b*n + 15*b*(-(n*Log[x]) + Lo
g[c*x^n])))/(225*e) - (d^2*(30*a - 31*b*n + 30*b*(-(n*Log[x]) + Log[c*x^n]
)))/(225*e^2)) - (2*b*d^(5/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(15*e^2)
```

3.252.3 Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 143, normalized size of antiderivative = 0.93, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.320, Rules used = {2792, 27, 354, 90, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{\left(2d-3ex^2\right)\left(ex^2+d\right)^{3/2}}{15e^2x}dx+\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{\left(2d-3ex^2\right)\left(ex^2+d\right)^{3/2}}{x}dx}{15e^2}+\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}$$

$$\Big\downarrow \text{354}$$

$$\frac{bn\int \frac{\left(2d-3ex^2\right)\left(ex^2+d\right)^{3/2}}{x^2}dx^2}{30e^2}+\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}$$

$$\Big\downarrow \text{90}$$

$$\frac{bn\left(2d\int \frac{\left(ex^2+d\right)^{3/2}}{x^2}dx^2-\frac{6}{5}\left(d+ex^2\right)^{5/2}\right)}{30e^2}+\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}$$

$$\Big\downarrow \text{60}$$

$$\frac{bn\left(2d\left(d\int \frac{\sqrt{ex^2+d}}{x^2}dx^2+\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)-\frac{6}{5}\left(d+ex^2\right)^{5/2}\right)}{30e^2}+\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}$$

$$\Big\downarrow \text{60}$$

$$\frac{bn\left(2d\left(d\left(d\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)+\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)-\frac{6}{5}\left(d+ex^2\right)^{5/2}\right)}{30e^2}+\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}$$

$$\Big\downarrow \text{73}$$

$$\frac{bn\left(2d\left(d\left(\frac{2d\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)+\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)-\frac{6}{5}\left(d+ex^2\right)^{5/2}\right)}{30e^2}+\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}$$

$$\Big\downarrow \text{221}$$

3.252. $\int x^3\sqrt{d+ex^2}(a+b\log\left(cx^n\right))\ dx$

$$\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e^2}-\frac{d\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}+\frac{bn\left(2d\left(d\left(2\sqrt{d+ex^2}-2\sqrt{d}\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)+\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)-\frac{6}{5}\left(d+ex^2\right)^{5/2}\right)}{30e^2}$$

input
```
Int[x^3*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(b*n*((-6*(d + e*x^2)^(5/2))/5 + 2*d*((2*(d + e*x^2)^(3/2))/3 + d*(2*Sqrt[
d + e*x^2] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]))))/(30*e^2) - (d*
(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^2) + ((d + e*x^2)^(5/2)*(a + b*
Log[c*x^n]))/(5*e^2)
```

3.252.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.252.4 Maple [F]

$$\int x^{3}\left(a+b\ln\left(c\,x^{n}\right)\right)\sqrt{e\,x^{2}+d}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

3.252.5 Fricas [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 309, normalized size of antiderivative = 2.01

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\ dx = \left[\frac{15\,bd^{\frac{5}{2}}n\log\left(-\frac{ex^2-2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(9\,(be^2n-5\,ae^2)x^4-31\,bd^2n+30\,ad^2+(8\,bden-15\,ade)x^2-15}{225\,e^2}\right.$$

input
```
integrate(x^3*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/225*(15*b*d^(5/2)*n*log(-(e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2)
 - (9*(b*e^2*n - 5*a*e^2)*x^4 - 31*b*d^2*n + 30*a*d^2 + (8*b*d*e*n - 15*a*
d*e)*x^2 - 15*(3*b*e^2*x^4 + b*d*e*x^2 - 2*b*d^2)*log(c) - 15*(3*b*e^2*n*x
^4 + b*d*e*n*x^2 - 2*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/e^2, 1/225*(30*b*sq
rt(-d)*d^2*n*arctan(sqrt(-d)/sqrt(e*x^2 + d)) - (9*(b*e^2*n - 5*a*e^2)*x^4
 - 31*b*d^2*n + 30*a*d^2 + (8*b*d*e*n - 15*a*d*e)*x^2 - 15*(3*b*e^2*x^4 +
b*d*e*x^2 - 2*b*d^2)*log(c) - 15*(3*b*e^2*n*x^4 + b*d*e*n*x^2 - 2*b*d^2*n)
*log(x))*sqrt(e*x^2 + d))/e^2]
```

3.252.6 Sympy [A] (verification not implemented)

Time = 14.27 (sec) , antiderivative size = 343, normalized size of antiderivative = 2.23

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = a\left(\begin{cases} -\frac{2d^2\sqrt{d+ex^2}}{15e^2} + \frac{dx^2\sqrt{d+ex^2}}{15e} + \frac{x^4\sqrt{d+ex^2}}{5} & \text{for } e\neq 0 \\ \frac{\sqrt{d}x^4}{4} & \text{otherwise} \end{cases}\right)$$
$$-bn\left(\begin{cases} \frac{2d^{\frac{5}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{15e^2} - \frac{2d^3}{15e^{\frac{5}{2}}x\sqrt{\frac{d}{ex^2}+1}} - \frac{2d^2x}{15e^{\frac{3}{2}}\sqrt{\frac{d}{ex^2}+1}} + \frac{d\left(\begin{cases} \frac{d\sqrt{d+ex^2}}{3e} + \frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0 \\ \frac{\sqrt{d}x^2}{2} & \text{otherwise} \end{cases}\right)}{15e} + \frac{\begin{cases} -\frac{2d^2\sqrt{d+e}}{15e^2} \\ \frac{\sqrt{d}x^4}{4} \end{cases}}{} \\ \frac{\sqrt{d}x^4}{16} \end{cases}\right.$$
$$+b\left(\begin{cases} -\frac{2d^2\sqrt{d+ex^2}}{15e^2} + \frac{dx^2\sqrt{d+ex^2}}{15e} + \frac{x^4\sqrt{d+ex^2}}{5} & \text{for } e\neq 0 \\ \frac{\sqrt{d}x^4}{4} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(a+b*ln(c*x**n))*(e*x**2+d)**(1/2),x)
```

output
```
a*Piecewise((-2*d**2*sqrt(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d + e*x**2)/
(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, True)) - b*n
*Piecewise((2*d**(5/2)*asinh(sqrt(d)/(sqrt(e)*x))/(15*e**2) - 2*d**3/(15*e
**(5/2)*x*sqrt(d/(e*x**2) + 1)) - 2*d**2*x/(15*e**(3/2)*sqrt(d/(e*x**2) +
1)) + d*Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d + e*x**2)/3, Ne(
e, 0)), (sqrt(d)*x**2/2, True))/(15*e) + Piecewise((-2*d**2*sqrt(d + e*x**
2)/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, N
e(e, 0)), (sqrt(d)*x**4/4, True))/5, (e > -oo) & (e < oo) & Ne(e, 0)), (sq
rt(d)*x**4/16, True)) + b*Piecewise((-2*d**2*sqrt(d + e*x**2)/(15*e**2) +
d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt
(d)*x**4/4, True))*log(c*x**n)
```

3.252.7 Maxima [F(-2)]

Exception generated.

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^3*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.252.8 Giac [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 215, normalized size of antiderivative = 1.40

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$= \frac{1}{5}\sqrt{ex^2+d}bx^4\log(c) + \frac{1}{5}\sqrt{ex^2+d}ax^4 + \frac{\sqrt{ex^2+d}bdx^2\log(c)}{15\,e} + \frac{\sqrt{ex^2+d}adx^2}{15\,e}$$
$$+ \frac{1}{225}bn\left(\frac{15\left(3\,(ex^2+d)^{\frac{5}{2}} - 5\,(ex^2+d)^{\frac{3}{2}}d\right)\log(x)}{e^2} + \frac{\frac{30\,d^3\arctan\left(\frac{\sqrt{ex^2+d}}{\sqrt{-d}}\right)}{\sqrt{-d}} - 9\,(ex^2+d)^{\frac{5}{2}} + 10\,(ex^2+d)^{\frac{3}{2}}}{e^2}\right.$$
$$- \frac{2\sqrt{ex^2+d}bd^2\log(c)}{15\,e^2} - \frac{2\sqrt{ex^2+d}ad^2}{15\,e^2}$$

input
```
integrate(x^3*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
1/5*sqrt(e*x^2 + d)*b*x^4*log(c) + 1/5*sqrt(e*x^2 + d)*a*x^4 + 1/15*sqrt(e
*x^2 + d)*b*d*x^2*log(c)/e + 1/15*sqrt(e*x^2 + d)*a*d*x^2/e + 1/225*b*n*(1
5*(3*(e*x^2 + d)^(5/2) - 5*(e*x^2 + d)^(3/2)*d)*log(x)/e^2 + (30*d^3*arcta
n(sqrt(e*x^2 + d)/sqrt(-d))/sqrt(-d) - 9*(e*x^2 + d)^(5/2) + 10*(e*x^2 + d
)^(3/2)*d + 30*sqrt(e*x^2 + d)*d^2)/e^2) - 2/15*sqrt(e*x^2 + d)*b*d^2*log(
c)/e^2 - 2/15*sqrt(e*x^2 + d)*a*d^2/e^2
```

3.252.9 Mupad [F(-1)]

Timed out.

$$\int x^3\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\int x^3\,\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x^3*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^3*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

3.253 $\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

3.253.1 Optimal result

Integrand size = 23, antiderivative size = 102

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=-\frac{bdn\sqrt{d+ex^2}}{3e}-\frac{bn(d+ex^2)^{3/2}}{9e}+\frac{bd^{3/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}$$

output
```
-1/9*b*n*(e*x^2+d)^(3/2)/e+1/3*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2)
)/e+1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/e-1/3*b*d*n*(e*x^2+d)^(1/2)/e
```

3.253.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 136, normalized size of antiderivative = 1.33

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$=\frac{3ad\sqrt{d+ex^2}-4bdn\sqrt{d+ex^2}+3aex^2\sqrt{d+ex^2}-benx^2\sqrt{d+ex^2}-3bd^{3/2}n\log(x)+3b(d+ex^2)^{3/2}\log}{9e}$$

input
```
Integrate[x*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(3*a*d*Sqrt[d + e*x^2] - 4*b*d*n*Sqrt[d + e*x^2] + 3*a*e*x^2*Sqrt[d + e*x^
2] - b*e*n*x^2*Sqrt[d + e*x^2] - 3*b*d^(3/2)*n*Log[x] + 3*b*(d + e*x^2)^(3
/2)*Log[c*x^n] + 3*b*d^(3/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(9*e)
```

3.253.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 95, normalized size of antiderivative = 0.93, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.261$, Rules used = {2776, 243, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2776}$$

$$\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{bn\int\frac{(ex^2+d)^{3/2}}{x}dx}{3e}$$

$$\Big\downarrow \text{243}$$

$$\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{bn\int\frac{(ex^2+d)^{3/2}}{x^2}dx^2}{6e}$$

$$\Big\downarrow \text{60}$$

$$\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{bn\left(d\int\frac{\sqrt{ex^2+d}}{x^2}dx^2+\frac{2}{3}(d+ex^2)^{3/2}\right)}{6e}$$

$$\Big\downarrow \text{60}$$

$$\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{bn\left(d\left(d\int\frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)}{6e}$$

$$\Big\downarrow \text{73}$$

$$\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{bn\left(d\left(\frac{2d\int\frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)}{6e}$$

$$\Big\downarrow \text{221}$$

$$\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e}-\frac{bn\left(d\left(2\sqrt{d+ex^2}-2\sqrt{d}\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)}{6e}$$

input
```
Int[x*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
-1/6*(b*n*((2*(d + e*x^2)^(3/2))/3 + d*(2*Sqrt[d + e*x^2] - 2*Sqrt[d]*ArcT
anh[Sqrt[d + e*x^2]/Sqrt[d]])))/e + ((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))
/(3*e)
```

3.253.3.1 Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

3.253. $\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

3.253.4 Maple [F]

$$\int x(a+b\ln(c\,x^n))\sqrt{e\,x^2+d}dx$$

input
```
int(x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

3.253.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 202, normalized size of antiderivative = 1.98

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$=\left[\frac{3\,bd^{\frac{3}{2}}n\log\left(-\frac{ex^2+2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-2\,(4\,bdn+(ben-3\,ae)x^2-3\,ad-3\,(bex^2+bd)\log(c)-3\,(benx^2+\right.$$
$$-\frac{3\,b\sqrt{-d}dn\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex^2+d}}\right)+(4\,bdn+(ben-3\,ae)x^2-3\,ad-3\,(bex^2+bd)\log(c)-3\,(benx^2+bdn)}{9\,e}$$

input
```
integrate(x*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/18*(3*b*d^(3/2)*n*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2) -
 2*(4*b*d*n + (b*e*n - 3*a*e)*x^2 - 3*a*d - 3*(b*e*x^2 + b*d)*log(c) - 3*(
b*e*n*x^2 + b*d*n)*log(x))*sqrt(e*x^2 + d))/e, -1/9*(3*b*sqrt(-d)*d*n*arct
an(sqrt(-d)/sqrt(e*x^2 + d)) + (4*b*d*n + (b*e*n - 3*a*e)*x^2 - 3*a*d - 3*
(b*e*x^2 + b*d)*log(c) - 3*(b*e*n*x^2 + b*d*n)*log(x))*sqrt(e*x^2 + d))/e]
```

3.253.6 Sympy [A] (verification not implemented)

Time = 11.60 (sec) , antiderivative size = 218, normalized size of antiderivative = 2.14

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = a\left(\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right) - bn\left(\begin{cases}-\frac{d^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{3e}+\frac{d^2}{3e^{\frac{3}{2}}x\sqrt{\frac{d}{ex^2}+1}}+\frac{dx}{3\sqrt{e}\sqrt{\frac{d}{ex^2}+1}}+\frac{\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}}{3} & \text{for } e>-\infty\wedge e\\ \frac{\sqrt{d}x^2}{4} & \text{otherwise}\end{cases}\right) + b\left(\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(a+b*ln(c*x**n))*(e*x**2+d)**(1/2),x)
```

output
```
a*Piecewise(((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0))
, (sqrt(d)*x**2/2, True)) - b*n*Piecewise((-d**(3/2)*asinh(sqrt(d)/(sqrt(e
)*x))/(3*e) + d**2/(3*e**(3/2)*x*sqrt(d/(e*x**2) + 1)) + d*x/(3*sqrt(e)*sq
rt(d/(e*x**2) + 1)) + Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d +
e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))/3, (e > -oo) & (e < oo) & Ne
(e, 0)), (sqrt(d)*x**2/4, True)) + b*Piecewise((d*sqrt(d + e*x**2)/(3*e) +
 x**2*sqrt(d + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))*log(c*x**n)
```

3.253.7 Maxima [F(-2)]

Exception generated.

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.253.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.38

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$=\frac{1}{3}\sqrt{ex^2+d}bx^2\log(c)+\frac{1}{3}\sqrt{ex^2+d}ax^2$$
$$+\frac{1}{9}\left(\frac{3\,(ex^2+d)^{\frac{3}{2}}\log(x)}{e}-\frac{\frac{3\,d^2\arctan\left(\frac{\sqrt{ex^2+d}}{\sqrt{-d}}\right)}{\sqrt{-d}}+(ex^2+d)^{\frac{3}{2}}+3\sqrt{ex^2+d}d}{e}\right)bn$$
$$+\frac{\sqrt{ex^2+d}bd\log(c)}{3\,e}+\frac{\sqrt{ex^2+d}ad}{3\,e}$$

input
```
integrate(x*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
1/3*sqrt(e*x^2 + d)*b*x^2*log(c) + 1/3*sqrt(e*x^2 + d)*a*x^2 + 1/9*(3*(e*x
^2 + d)^(3/2)*log(x)/e - (3*d^2*arctan(sqrt(e*x^2 + d)/sqrt(-d))/sqrt(-d)
+ (e*x^2 + d)^(3/2) + 3*sqrt(e*x^2 + d)*d)/e)*b*n + 1/3*sqrt(e*x^2 + d)*b*
d*log(c)/e + 1/3*sqrt(e*x^2 + d)*a*d/e
```

3.253.9 Mupad [F(-1)]

Timed out.

$$\int x\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\int x\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

3.254 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx$

3.254.1 Optimal result

Integrand size = 25, antiderivative size = 220

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx = -bn\sqrt{d+ex^2}+b\sqrt{d}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right) + \frac{1}{2}b\sqrt{d}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2 + \left(\sqrt{d+ex^2} - \sqrt{d}\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+b\log(cx^n)) - b\sqrt{d}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right) - \frac{1}{2}b\sqrt{d}n\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)$$

output
```
b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*d^(1/2)+1/2*b*n*arctanh((e*x^2+d)^(1/
2)/d^(1/2))^2*d^(1/2)-b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d
^(1/2)-(e*x^2+d)^(1/2)))*d^(1/2)-1/2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e
*x^2+d)^(1/2)))*d^(1/2)-b*n*(e*x^2+d)^(1/2)+(a+b*ln(c*x^n))*(-arctanh((e*x
^2+d)^(1/2)/d^(1/2))*d^(1/2)+(e*x^2+d)^(1/2))
```

3.254.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.21 (sec) , antiderivative size = 203, normalized size of antiderivative = 0.92

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx$$
$$= \frac{bn\sqrt{d+ex^2}\left(-{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{d}{ex^2}\right)+\sqrt{1+\frac{d}{ex^2}}\log(x)-\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\log(x)}{\sqrt{e}x}\right)}{\sqrt{1+\frac{d}{ex^2}}}$$
$$+\sqrt{d+ex^2}(a-bn\log(x)+b\log(cx^n))+\sqrt{d}\log(x)\left(a-bn\log(x)+b\log(cx^n)\right)$$
$$-\sqrt{d}(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)$$

input
```
Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x,x]
```

output
```
(b*n*Sqrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/2}, {1/2, 1/2}, -
(d/(e*x^2))] + Sqrt[1 + d/(e*x^2)]*Log[x] - (Sqrt[d]*ArcSinh[Sqrt[d]/(Sqrt
[e]*x)]*Log[x])/(Sqrt[e]*x)))/Sqrt[1 + d/(e*x^2)] + Sqrt[d + e*x^2]*(a - b
*n*Log[x] + b*Log[c*x^n]) + Sqrt[d]*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n])
 - Sqrt[d]*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]
]
```

3.254.3 Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 213, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx$$
$$\Big\downarrow \; 2790$$

$$\left(\sqrt{d+ex^2}-\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+b\log(cx^n))-$$
$$bn\int\left(\frac{\sqrt{ex^2+d}}{x}-\frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\left(\sqrt{d+ex^2}-\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)(a+b\log(cx^n))-$$
$$bn\left(-\frac{1}{2}\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\right.$$

input
```
Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x,x]
```

output
```
(Sqrt[d + e*x^2] - Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])*(a + b*Log[c*
x^n]) - b*n*(Sqrt[d + e*x^2] - Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]] -
(Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]^2)/2 + Sqrt[d]*ArcTanh[Sqrt[d +
e*x^2]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])] + (Sqrt[d]*Po
lyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/2)
```

3.254.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

3.254.4 Maple [F]

$$\int \frac{(a+b\ln (c\,x^{n}))\,\sqrt{e\,x^{2}+d}}{x}dx$$

input
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x,x)
```

output
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x,x)
```

3.254.5 Fricas [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log (cx^n))}{x}\,dx=\int \frac{\sqrt{ex^2+d}(b\log (cx^n)+a)}{x}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x,x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/x, x)
```

3.254.6 Sympy [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log (cx^n))}{x}\,dx=\int \frac{(a+b\log (cx^n))\,\sqrt{d+ex^2}}{x}\,dx$$

input
```
integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2)/x,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x, x)
```

3.254.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.254.8 Giac [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)/x, x)
```

3.254.9 Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x, x)
```

3.255 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx$

3.255.1 Optimal result

Integrand size = 25, antiderivative size = 252

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx = -\frac{bn\sqrt{d+ex^2}}{4x^2} - \frac{ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4\sqrt{d}} + \frac{ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4\sqrt{d}} - \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2x^2} - \frac{e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}} - \frac{ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2\sqrt{d}} - \frac{ben\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{4\sqrt{d}}$$

output
```
-1/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(1/2)+1/4*b*e*n*arctanh((e*x
^2+d)^(1/2)/d^(1/2))^2/d^(1/2)-1/2*e*arctanh((e*x^2+d)^(1/2)/d^(1/2))*(a+b
*ln(c*x^n))/d^(1/2)-1/2*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2
)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(1/2)-1/4*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1
/2)-(e*x^2+d)^(1/2)))/d^(1/2)-1/4*b*n*(e*x^2+d)^(1/2)/x^2-1/2*(a+b*ln(c*x^
n))*(e*x^2+d)^(1/2)/x^2
```

3.255.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.30 (sec) , antiderivative size = 303, normalized size of antiderivative = 1.20

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx$$
$$= \frac{-2b\sqrt{d}n\sqrt{d+ex^2}\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{d}{ex^2}\right)-b\sqrt{e}nx\sqrt{d+ex^2}\,\text{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)(1+2\log(x))+\sqrt{1+\frac{d}{ex^2}}\Big(-2}{}$$

input
```
Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(-2*b*Sqrt[d]*n*Sqrt[d + e*x^2]*HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2, 3
/2}, -(d/(e*x^2))] - b*Sqrt[e]*n*x*Sqrt[d + e*x^2]*ArcSinh[Sqrt[d]/(Sqrt[e
]*x)]*(1 + 2*Log[x]) + Sqrt[1 + d/(e*x^2)]*(-2*a*Sqrt[d]*Sqrt[d + e*x^2] -
 b*Sqrt[d]*n*Sqrt[d + e*x^2] - 2*b*e*n*x^2*Log[x]^2 - 2*a*e*x^2*Log[d + Sq
rt[d]*Sqrt[d + e*x^2]] + 2*e*x^2*Log[x]*(a + b*Log[c*x^n] + b*n*Log[d + Sq
rt[d]*Sqrt[d + e*x^2]]) - 2*b*Log[c*x^n]*(Sqrt[d]*Sqrt[d + e*x^2] + e*x^2*
Log[d + Sqrt[d]*Sqrt[d + e*x^2]])))/(4*Sqrt[d]*Sqrt[1 + d/(e*x^2)]*x^2)
```

3.255.3 Rubi [A] (verified)

Time = 0.66 (sec) , antiderivative size = 247, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx$$
$$\Big\downarrow \text{ 2792}$$
$$-bn\int -\frac{\frac{e\,\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)x^2}{\sqrt{d}}+\sqrt{ex^2+d}}{2x^3}dx-\frac{e\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2x^2}$$
$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}bn\int \frac{\frac{e\operatorname{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)x^2}{\sqrt{d}}+\sqrt{ex^2+d}}{x^3}dx-\frac{e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2x^2}$$

$\downarrow$ 2010

$$\frac{1}{2}bn\int \left(\frac{e\operatorname{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{\sqrt{d}x}+\frac{\sqrt{ex^2+d}}{x^3}\right)dx-\frac{e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2x^2}$$

$\downarrow$ 2009

$$-\frac{e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2x^2}+\frac{1}{2}bn\left(\frac{e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2\sqrt{d}}-\frac{e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{2\sqrt{d}}-\frac{e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{\sqrt{d}}-\frac{e\operatorname{PolyLog}\left(2,1-\frac{}{\sqrt{d-}}\right.}{2\sqrt{d}}\right.$$

input
```
Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/2*(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^2 - (e*ArcTanh[Sqrt[d + e*x^2]
/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*Sqrt[d]) + (b*n*(-1/2*Sqrt[d + e*x^2]/x^2
 - (e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(2*Sqrt[d]) + (e*ArcTanh[Sqrt[d +
e*x^2]/Sqrt[d]]^2)/(2*Sqrt[d]) - (e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*Log[(
2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/Sqrt[d] - (e*PolyLog[2, 1 - (2*Sq
rt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(2*Sqrt[d])))/2
```

3.255.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.255.4 Maple [F]

$$\int \frac{(a+b\ln(c\,x^{n}))\sqrt{e\,x^{2}+d}}{x^{3}}dx$$

input
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^3,x)
```

output
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^3,x)
```

3.255.5 Fricas [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^3,x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/x^3, x)
```

3.255.6 Sympy [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex^2}}{x^3}\,dx$$

input
```
integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2)/x**3,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**3, x)
```

3.255.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.255.8 Giac [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^3,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)/x^3, x)
```

3.255.9 Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))}{x^3}\,dx$$

input
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^3,x)
```

output
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^3, x)
```

3.256 $\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

3.256.1 Optimal result

Integrand size = 25, antiderivative size = 469

$$\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$= \frac{7bd^2nx\sqrt{d+ex^2}}{192e^2} - \frac{5bdnx^3\sqrt{d+ex^2}}{288e} - \frac{1}{36}bnx^5\sqrt{d+ex^2} + \frac{5bd^{5/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{192e^{5/2}\sqrt{1+\frac{ex^2}{d}}}$$
$$+ \frac{bd^{5/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{32e^{5/2}\sqrt{1+\frac{ex^2}{d}}} - \frac{bd^{5/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{16e^{5/2}\sqrt{1+\frac{ex^2}{d}}}$$
$$- \frac{d^2x\sqrt{d+ex^2}(a+b\log(cx^n))}{16e^2} + \frac{dx^3\sqrt{d+ex^2}(a+b\log(cx^n))}{24e}$$
$$+ \frac{1}{6}x^5\sqrt{d+ex^2}(a+b\log(cx^n)) + \frac{d^{5/2}\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{5/2}\sqrt{1+\frac{ex^2}{d}}} - \frac{bd^{5/2}n\sqrt{d+ex^2}\operatorname{PolyLog}}{32e^{5/2}\sqrt{1+}}$$

output
```
7/192*b*d^2*n*x*(e*x^2+d)^(1/2)/e^2-5/288*b*d*n*x^3*(e*x^2+d)^(1/2)/e-1/36
*b*n*x^5*(e*x^2+d)^(1/2)-1/16*d^2*x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e^2+1/
24*d*x^3*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e+1/6*x^5*(a+b*ln(c*x^n))*(e*x^2+
d)^(1/2)+5/192*b*d^(5/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*(e*x^2+d)^(1/2)/e^(5
/2)/(1+e*x^2/d)^(1/2)+1/32*b*d^(5/2)*n*arcsinh(x*e^(1/2)/d^(1/2))^2*(e*x^2
+d)^(1/2)/e^(5/2)/(1+e*x^2/d)^(1/2)-1/16*b*d^(5/2)*n*arcsinh(x*e^(1/2)/d^(
1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(e*x^2+d)^(1/2)/e^(5/2
)/(1+e*x^2/d)^(1/2)+1/16*d^(5/2)*arcsinh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n)
)*(e*x^2+d)^(1/2)/e^(5/2)/(1+e*x^2/d)^(1/2)-1/32*b*d^(5/2)*n*polylog(2,(x*
e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(e*x^2+d)^(1/2)/e^(5/2)/(1+e*x^2/d)^
(1/2)
```

3.256.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.38 (sec) , antiderivative size = 276, normalized size of antiderivative = 0.59

$$\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$= \frac{-48be^{5/2}nx^5\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{ex^2}{d}\right)+75bd^{5/2}n\sqrt{d+ex^2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log(x)+25\sqrt{1+\frac{ex^2}{d}}\,(}{}$$

input
```
Integrate[x^4*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(-48*b*e^(5/2)*n*x^5*Sqrt[d + e*x^2]*HypergeometricPFQ[{-1/2, 5/2, 5/2}, {
7/2, 7/2}, -((e*x^2)/d)] + 75*b*d^(5/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]
*x)/Sqrt[d]]*Log[x] + 25*Sqrt[1 + (e*x^2)/d]*(a*Sqrt[e]*x*Sqrt[d + e*x^2]*
(-3*d^2 + 2*d*e*x^2 + 8*e^2*x^4) + 3*d^3*(a - b*n*Log[x])*Log[e*x + Sqrt[e
]*Sqrt[d + e*x^2]] + b*Log[c*x^n]*(Sqrt[e]*x*Sqrt[d + e*x^2]*(-3*d^2 + 2*d
*e*x^2 + 8*e^2*x^4) + 3*d^3*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])))/(1200*e^
(5/2)*Sqrt[1 + (e*x^2)/d])
```

3.256.3 Rubi [A] (verified)

Time = 0.86 (sec) , antiderivative size = 373, normalized size of antiderivative = 0.80, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2786, 2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2786}$$

$$\frac{\sqrt{d+ex^2}\int x^4\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))\,dx}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{\sqrt{d+ex^2}\left(-bn\int -\frac{\sqrt{e}x\sqrt{\frac{ex^2}{d}+1}(-8e^2x^4-2dex^2+3d^2)-3d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{48e^{5/2}x}dx+\frac{d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{5/2}}-\frac{d^2x\sqrt{\frac{ex^2}{d}+\dots}}{\dots}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{27}$$

$$\frac{\sqrt{d+ex^2}\left(\frac{bn\int\frac{\sqrt{e}x\sqrt{\frac{ex^2}{d}+1}(-8e^2x^4-2dex^2+3d^2)-3d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{48e^{5/2}}+\frac{d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{5/2}}-\frac{d^2x\sqrt{\frac{ex^2}{d}+1}(a+b\log\dots}{16e^2}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2010}$$

$$\frac{\sqrt{d+ex^2}\left(\frac{bn\int\left(-8e^{5/2}\sqrt{\frac{ex^2}{d}+1}x^4-2de^{3/2}\sqrt{\frac{ex^2}{d}+1}x^2+3d^2\sqrt{e}\sqrt{\frac{ex^2}{d}+1}-\frac{3d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}\right)dx}{48e^{5/2}}+\frac{d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n\dots}{16e^{5/2}}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2009}$$

$$\sqrt{d+ex^2}\left(\frac{d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{5/2}}-\frac{d^2x\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{16e^2}+\frac{1}{6}x^5\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))+\frac{dx^3\sqrt{\frac{ex^2}{d}+1}(a+\right.$$

input
```
Int[x^4*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(Sqrt[d + e*x^2]*(-1/16*(d^2*x*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/e^2
 + (d*x^3*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(24*e) + (x^5*Sqrt[1 + (
e*x^2)/d]*(a + b*Log[c*x^n]))/6 + (d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a
 + b*Log[c*x^n]))/(16*e^(5/2)) + (b*n*((7*d^2*Sqrt[e]*x*Sqrt[1 + (e*x^2)/d
])/4 - (5*d*e^(3/2)*x^3*Sqrt[1 + (e*x^2)/d])/6 - (4*e^(5/2)*x^5*Sqrt[1 + (
e*x^2)/d])/3 + (5*d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/4 + (3*d^(5/2)*Arc
Sinh[(Sqrt[e]*x)/Sqrt[d]]^2)/2 - 3*d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Lo
g[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])] - (3*d^(5/2)*PolyLog[2, E^(2*Arc
Sinh[(Sqrt[e]*x)/Sqrt[d]])])/2))/(48*e^(5/2))))/Sqrt[1 + (e*x^2)/d]
```

3.256.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.256.4 Maple [F]

$$\int x^4(a+b\ln(c\,x^n))\,\sqrt{e\,x^2+d}dx$$

input
```
int(x^4*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

output
```
int(x^4*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

3.256.5 Fricas [F]

$$\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\int\sqrt{ex^2+d}(b\log(cx^n)+a)x^4\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)*b*x^4*log(c*x^n) + sqrt(e*x^2 + d)*a*x^4, x)
```

3.256.6 Sympy [F]

$$\int x^4\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\int x^4(a+b\log(cx^n))\,\sqrt{d+ex^2}\,dx$$

input
```
integrate(x**4*(a+b*ln(c*x**n))*(e*x**2+d)**(1/2),x)
```

output
```
Integral(x**4*(a + b*log(c*x**n))*sqrt(d + e*x**2), x)
```

3.256.7 Maxima [F(-2)]

Exception generated.

$$\int x^4\sqrt{d+ex^2}(a+b\log{(cx^n)})\ dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^4*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.256.8 Giac [F]

$$\int x^4\sqrt{d+ex^2}(a+b\log{(cx^n)})\ dx = \int \sqrt{ex^2+d}(b\log{(cx^n)}+a)x^4\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)*x^4, x)
```

3.256.9 Mupad [F(-1)]

Timed out.

$$\int x^4\sqrt{d+ex^2}(a+b\log{(cx^n)})\ dx = \int x^4\,\sqrt{e\,x^2+d}\,\left(a+b\,\ln{\left(c\,x^n\right)}\right)\,dx$$

input
```
int(x^4*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^4*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

3.257 $\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

3.257.1 Optimal result

Integrand size = 25, antiderivative size = 409

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = -\frac{3bdnx\sqrt{d+ex^2}}{32e}-\frac{1}{16}bnx^3\sqrt{d+ex^2} -\frac{bd^{3/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{32e^{3/2}\sqrt{1+\frac{ex^2}{d}}}-\frac{bd^{3/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{16e^{3/2}\sqrt{1+\frac{ex^2}{d}}} +\frac{bd^{3/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{8e^{3/2}\sqrt{1+\frac{ex^2}{d}}}+\frac{dx\sqrt{d+ex^2}(a+b\log(cx^n))}{8e} +\frac{1}{4}x^3\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{d^{3/2}\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8e^{3/2}\sqrt{1+\frac{ex^2}{d}}}+\frac{bd^{3/2}n\sqrt{d+ex^2}\,\text{PolyLog}}{16e^{3/2}\sqrt{1+}}$$

output
```
-3/32*b*d*n*x*(e*x^2+d)^(1/2)/e-1/16*b*n*x^3*(e*x^2+d)^(1/2)+1/8*d*x*(a+b*
ln(c*x^n))*(e*x^2+d)^(1/2)/e+1/4*x^3*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)-1/32*
b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*(e*x^2+d)^(1/2)/e^(3/2)/(1+e*x^2/d)
^(1/2)-1/16*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))^2*(e*x^2+d)^(1/2)/e^(3/
2)/(1+e*x^2/d)^(1/2)+1/8*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^
(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(e*x^2+d)^(1/2)/e^(3/2)/(1+e*x^2/d)^(1
/2)-1/8*d^(3/2)*arcsinh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)
/e^(3/2)/(1+e*x^2/d)^(1/2)+1/16*b*d^(3/2)*n*polylog(2,(x*e^(1/2)/d^(1/2)+(
1+e*x^2/d)^(1/2))^2)*(e*x^2+d)^(1/2)/e^(3/2)/(1+e*x^2/d)^(1/2)
```

3.257.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.27 (sec) , antiderivative size = 250, normalized size of antiderivative = 0.61

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$= \frac{-8be^{3/2}nx^3\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)-9bd^{3/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log(x)+9\sqrt{1+\frac{ex^2}{d}}(a\sqrt{}}{}$$

input
```
Integrate[x^2*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(-8*b*e^(3/2)*n*x^3*Sqrt[d + e*x^2]*HypergeometricPFQ[{-1/2, 3/2, 3/2}, {5
/2, 5/2}, -((e*x^2)/d)] - 9*b*d^(3/2)*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x
)/Sqrt[d]]*Log[x] + 9*Sqrt[1 + (e*x^2)/d]*(a*Sqrt[e]*x*Sqrt[d + e*x^2]*(d
+ 2*e*x^2) + d^2*(-a + b*n*Log[x])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]] + b*
Log[c*x^n]*(Sqrt[e]*x*Sqrt[d + e*x^2]*(d + 2*e*x^2) - d^2*Log[e*x + Sqrt[e
]*Sqrt[d + e*x^2]])))/(72*e^(3/2)*Sqrt[1 + (e*x^2)/d])
```

3.257.3 Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 317, normalized size of antiderivative = 0.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.120$, Rules used = {2786, 2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$\Big\downarrow \ 2786$$
$$\frac{\sqrt{d+ex^2}\int x^2\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))\,dx}{\sqrt{\frac{ex^2}{d}+1}}$$
$$\Big\downarrow \ 2792$$

$$\frac{\sqrt{d+ex^2}\left(-bn\int\left(\frac{(2ex^2+d)\sqrt{\frac{ex^2}{d}+1}}{8e}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{8e^{3/2}x}\right)dx-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n}{8e}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$\downarrow$ 2009

$$\frac{\sqrt{d+ex^2}\left(-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{8e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{8e}+\frac{1}{4}x^3\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))-bn\left(-\frac{d^{3/2}\text{Po}}{}\right.\right.}{}$$

input
```
Int[x^2*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(Sqrt[d + e*x^2]*((d*x*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(8*e) + (x^
3*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/4 - (d^(3/2)*ArcSinh[(Sqrt[e]*x)
/Sqrt[d]]*(a + b*Log[c*x^n]))/(8*e^(3/2)) - b*n*((d*x*Sqrt[1 + (e*x^2)/d])
/(32*e) + (d*x*(1 + (e*x^2)/d)^(3/2))/(16*e) + (d^(3/2)*ArcSinh[(Sqrt[e]*x
)/Sqrt[d]])/(32*e^(3/2)) + (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(16*e^
(3/2)) - (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[
e]*x)/Sqrt[d]])])/(8*e^(3/2)) - (d^(3/2)*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*
x)/Sqrt[d]])])/(16*e^(3/2)))))/Sqrt[1 + (e*x^2)/d]
```

3.257.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.257.4 Maple [F]

$$\int x^2(a+b\ln(c\,x^n))\sqrt{e\,x^2+d}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

3.257.5 Fricas [F]

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\int\sqrt{ex^2+d}(b\log(cx^n)+a)x^2\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)*b*x^2*log(c*x^n) + sqrt(e*x^2 + d)*a*x^2, x)
```

3.257.6 Sympy [F]

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx=\int x^2(a+b\log(cx^n))\sqrt{d+ex^2}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))*(e*x**2+d)**(1/2),x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))*sqrt(d + e*x**2), x)
```

3.257.7 Maxima [F(-2)]

Exception generated.

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^2*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.257.8 Giac [F]

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \int \sqrt{ex^2+d}(b\log(cx^n)+a)x^2\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)*x^2, x)
```

3.257.9 Mupad [F(-1)]

Timed out.

$$\int x^2\sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \int x^2\,\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x^2*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^2*(d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

3.258 $\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

3.258.1 Optimal result

Integrand size = 22, antiderivative size = 330

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx = -\frac{1}{4}bnx\sqrt{d+ex^2}+\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{4\sqrt{e}\sqrt{d+ex^2}} - \frac{bdn\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{4\sqrt{e}} - \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2\sqrt{e}\sqrt{d+ex^2}} + \frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n)) + \frac{d^{3/2}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{e}\sqrt{d+ex^2}} - \frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{4\sqrt{e}\sqrt{d+ex^2}}$$

output
```
-1/4*b*d*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/e^(1/2)-1/4*b*n*x*(e*x^2+d)^
(1/2)+1/2*x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)+1/4*b*d^(3/2)*n*arcsinh(x*e^(1
/2)/d^(1/2))^2*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)-1/2*b*d^(3/2)*n*a
rcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(1
+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)+1/2*d^(3/2)*arcsinh(x*e^(1/2)/d^(1
/2))*(a+b*ln(c*x^n))*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)-1/4*b*d^(3/
2)*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(1+e*x^2/d)^(1/2)/
e^(1/2)/(e*x^2+d)^(1/2)
```

3.258.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.23 (sec) , antiderivative size = 237, normalized size of antiderivative = 0.72

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$
$$= \frac{-2b\sqrt{e}nx\sqrt{d+ex^2}\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{ex^2}{d}\right)+b\sqrt{d}n\sqrt{d+ex^2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(-1+2\log(x))+\sqrt{1+\frac{ex^2}{d}}(\cdots}{}$$

input
```
Integrate[Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
(-2*b*Sqrt[e]*n*x*Sqrt[d + e*x^2]*HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2,
 3/2}, -((e*x^2)/d)] + b*Sqrt[d]*n*Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqr
t[d]]*(-1 + 2*Log[x]) + Sqrt[1 + (e*x^2)/d]*(Sqrt[e]*(2*a - b*n)*x*Sqrt[d
+ e*x^2] + 2*d*(a - b*n*Log[x])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]] + 2*b*L
og[c*x^n]*(Sqrt[e]*x*Sqrt[d + e*x^2] + d*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]
])))/(4*Sqrt[e]*Sqrt[1 + (e*x^2)/d])
```

3.258.3 Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.83 (sec) , antiderivative size = 249, normalized size of antiderivative = 0.75, number of steps used = 15, number of rules used = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.636$, Rules used = {2758, 211, 224, 219, 2764, 2762, 6190, 3042, 26, 4199, 25, 2620, 2715, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2758}$$

$$\frac{1}{2}d\int \frac{a+b\log(cx^n)}{\sqrt{ex^2+d}}dx-\frac{1}{2}bn\int \sqrt{ex^2+d}dx+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{211}$$

$$\frac{1}{2}d\int \frac{a+b\log(cx^n)}{\sqrt{ex^2+d}}dx-\frac{1}{2}bn\left(\frac{1}{2}d\int \frac{1}{\sqrt{ex^2+d}}dx+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{224}$$

$$\frac{1}{2}d\int \frac{a+b\log(cx^n)}{\sqrt{ex^2+d}}dx-\frac{1}{2}bn\left(\frac{1}{2}d\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+ \frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{219}$$

$$\frac{1}{2}d\int \frac{a+b\log(cx^n)}{\sqrt{ex^2+d}}dx+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))- \frac{1}{2}bn\left(\frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$$\Big\downarrow \text{2764}$$

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\int \frac{a+b\log(cx^n)}{\sqrt{\frac{ex^2}{d}+1}}dx}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))- \frac{1}{2}bn\left(\frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$$\Big\downarrow \text{2762}$$

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int \frac{\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+ \frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$$\Big\downarrow \text{6190}$$

3.258. $\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int\frac{\sqrt{d}\sqrt{\frac{ex^2}{d}+1}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}x}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$$\Big\downarrow \text{ 3042}$$

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int-i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\tan\left(i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)+\frac{\pi}{2}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$$\Big\downarrow \text{ 26}$$

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\int\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\tan\left(i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)+\frac{\pi}{2}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$$\Big\downarrow \text{ 4199}$$

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(2i\int-\frac{e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2\right)}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$$\Big\downarrow \text{ 25}$$

3.258. $\int\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\int\frac{e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2\right.}{\sqrt{e}}\right.}{2\sqrt{d+ex^2}}$$

$$\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$\downarrow$ 2620

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(\frac{1}{2}\int\log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-\right.\right.\right.}{\sqrt{e}}\right.}{2\sqrt{d+ex^2}}$$

$$\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$\downarrow$ 2715

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(\frac{1}{4}\int e^{-2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)de^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}-\frac{1}{2}\text{arcs}\right.\right.}{\sqrt{e}}\right.}{2\sqrt{d+ex^2}}$$

$$\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

$\downarrow$ 2838

$$\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(-\frac{1}{4}\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)-\frac{1}{2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\text{arcsinh}\left(\right.}\right.\right.\right.}{\sqrt{e}}\right.}{2\sqrt{d+ex^2}}$$

$$\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)$$

3.258. $\int\sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

input
```
Int[Sqrt[d + e*x^2]*(a + b*Log[c*x^n]),x]
```

output
```
-1/2*(b*n*((x*Sqrt[d + e*x^2])/2 + (d*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]
)/(2*Sqrt[e]))) + (x*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/2 + (d*Sqrt[1 + (
e*x^2)/d]*((Sqrt[d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[
e] + (I*b*Sqrt[d]*n*((-1/2*I)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2 - (2*I)*(-1/2
*(ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])]
) - PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])]/4)))/Sqrt[e]))/(2*Sqrt[
d + e*x^2])
```

3.258.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 26
```
Int[(Complex[0, a_])*(Fx_), x_Symbol] :> Simp[(Complex[Identity[0], a])   I
nt[Fx, x], x] /; FreeQ[a, x] && EqQ[a^2, 1]
```

rule 211
```
Int[((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[x*((a + b*x^2)^p/(2*p + 1
)), x] + Simp[2*a*(p/(2*p + 1))   Int[(a + b*x^2)^(p - 1), x], x] /; FreeQ[
{a, b}, x] && GtQ[p, 0] && (IntegerQ[4*p] || IntegerQ[6*p])
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 2620
```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[d*(m/(b*f*g*n*Log[F]))   Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x
)))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

rule 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[1/(d*e*n*Log[F])   Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x)
))^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

rule 2758
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_.), x_Sy
mbol] :> Simp[x*(d + e*x^2)^q*((a + b*Log[c*x^n])/(2*q + 1)), x] + (-Simp[b
*(n/(2*q + 1))   Int[(d + e*x^2)^q, x], x] + Simp[2*d*(q/(2*q + 1))   Int[(
d + e*x^2)^(q - 1)*(a + b*Log[c*x^n]), x], x]) /; FreeQ[{a, b, c, d, e, n},
 x] && GtQ[q, 0]
```

rule 2762
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]*((a + b*Log[c*x^n])/Rt[e, 2]), x]
 - Simp[b*(n/Rt[e, 2])   Int[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]/x, x], x] /; Fre
eQ[{a, b, c, d, e, n}, x] && GtQ[d, 0] && PosQ[e]
```

rule 2764
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[Sqrt[1 + (e/d)*x^2]/Sqrt[d + e*x^2]   Int[(a + b*Log[c*x^n])/Sq
rt[1 + (e/d)*x^2], x], x] /; FreeQ[{a, b, c, d, e, n}, x] &&  !GtQ[d, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4199
```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Simp
[2*I   Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x
))/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && In
tegerQ[4*k] && IGtQ[m, 0]
```

rule 6190
```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Simp[1/b
 Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[n, 0]
```

3.258. $\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx$

3.258.4 Maple [F]

$$\int (a + b\ln (c\,x^{n}))\,\sqrt{e\,x^{2}+d}dx$$

input
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2),x)
```

3.258.5 Fricas [F]

$$\int \sqrt{d+ex^2}(a+b\log (cx^n))\ dx = \int \sqrt{ex^2+d}(b\log (cx^n)+a)\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral(sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a, x)
```

3.258.6 Sympy [F]

$$\int \sqrt{d+ex^2}(a+b\log (cx^n))\ dx = \int (a+b\log (cx^n))\,\sqrt{d+ex^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2), x)
```

3.258.7 Maxima [F(-2)]

Exception generated.

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.258.8 Giac [F]

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \int \sqrt{ex^2+d}(b\log(cx^n)+a)\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a), x)
```

3.258.9 Mupad [F(-1)]

Timed out.

$$\int \sqrt{d+ex^2}(a+b\log(cx^n))\,dx = \int \sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((d + e*x^2)^(1/2)*(a + b*log(c*x^n)),x)
```

output
```
int((d + e*x^2)^(1/2)*(a + b*log(c*x^n)), x)
```

3.259 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx$

3.259.1 Optimal result

Integrand size = 25, antiderivative size = 345

$$\begin{aligned}\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx &= -\frac{bn\sqrt{d+ex^2}}{x}+\frac{b\sqrt{e}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}\\
&+\frac{b\sqrt{e}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{2\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}\\
&-\frac{b\sqrt{e}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}\\
&-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x}\\
&+\frac{\sqrt{e}\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}\\
&-\frac{b\sqrt{e}n\sqrt{d+ex^2}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}\end{aligned}$$

output
```
-b*n*(e*x^2+d)^(1/2)/x-(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x+b*n*arcsinh(x*e^(
1/2)/d^(1/2))*e^(1/2)*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)+1/2*b*n*ar
csinh(x*e^(1/2)/d^(1/2))^2*e^(1/2)*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/
2)-b*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2
))^2)*e^(1/2)*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)+arcsinh(x*e^(1/2)/
d^(1/2))*(a+b*ln(c*x^n))*e^(1/2)*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)
-1/2*b*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*e^(1/2)*(e*x^2
+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)
```

3.259.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.33 (sec) , antiderivative size = 183, normalized size of antiderivative = 0.53

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx = \frac{bn\sqrt{d+ex^2}\left(-{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{ex^2}{d}\right)-\sqrt{1+\frac{ex^2}{d}}\log(x)+\frac{\sqrt{e}x\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log(x)}{\sqrt{d}}\right)}{x\sqrt{1+\frac{ex^2}{d}}} - \frac{\sqrt{d+ex^2}(a-bn\log(x)+b\log(cx^n))}{x} + \sqrt{e}(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)$$

input
```
Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
(b*n*Sqrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/2}, {1/2, 1/2}, -
((e*x^2)/d)] - Sqrt[1 + (e*x^2)/d]*Log[x] + (Sqrt[e]*x*ArcSinh[(Sqrt[e]*x)
/Sqrt[d]]*Log[x])/Sqrt[d]))/(x*Sqrt[1 + (e*x^2)/d]) - (Sqrt[d + e*x^2]*(a
- b*n*Log[x] + b*Log[c*x^n]))/x + Sqrt[e]*(a - b*n*Log[x] + b*Log[c*x^n])*
Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]]
```

3.259.3 Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 246, normalized size of antiderivative = 0.71, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2786, 2792, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}dx$$

$$\Big\downarrow \ 2786$$

$$\frac{\sqrt{d+ex^2}\int \frac{\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{x^2}dx}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \ 2792$$

$$\frac{\sqrt{d+ex^2}\left(-bn\int -\frac{\sqrt{\frac{ex^2}{d}+1}-\frac{\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}}}{x^2}dx+\frac{\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{x}\right)}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \ 25$$

$$\frac{\sqrt{d+ex^2}\left(bn\int \frac{\sqrt{\frac{ex^2}{d}+1}-\frac{\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}}}{x^2}dx+\frac{\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{x}\right)}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \ 2010$$

$$\frac{\sqrt{d+ex^2}\left(bn\int \left(\frac{\sqrt{\frac{ex^2}{d}+1}}{x^2}-\frac{\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{d}x}\right)dx+\frac{\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{x}\right)}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \ 2009$$

$$\frac{\sqrt{d+ex^2}\left(\frac{\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}-\frac{\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{x}+bn\left(-\frac{\sqrt{e}\,\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2\sqrt{d}}+\frac{\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2\sqrt{d}}\right.\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

input
```
Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
(Sqrt[d + e*x^2]*(-((Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/x) + (Sqrt[e]
*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[d] + b*n*(-(Sqrt[1
+ (e*x^2)/d]/x) + (Sqrt[e]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/Sqrt[d] + (Sqrt[e
]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(2*Sqrt[d]) - (Sqrt[e]*ArcSinh[(Sqrt[e]*
x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/Sqrt[d] - (Sqrt[e
]*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*Sqrt[d]))))/Sqrt[1 +
(e*x^2)/d]
```

3.259.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

3.259. $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx$

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.259.4 Maple [F]

$$\int \frac{(a+b\ln(c\,x^n))\sqrt{e\,x^2+d}}{x^2}dx$$

input
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^2,x)
```

output
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^2,x)
```

3.259.5 Fricas [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^2,x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/x^2, x)
```

3.259.6 Sympy [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex^2}}{x^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2)/x**2,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**2, x)
```

3.259.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.259.8 Giac [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^2,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)/x^2, x)
```

3.259.9 Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))}{x^2}\,dx$$

input
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^2,x)
```

output
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^2, x)
```

3.260 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4} dx$

3.260.1 Optimal result

Integrand size = 25, antiderivative size = 112

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4} dx = -\frac{ben\sqrt{d+ex^2}}{3dx} - \frac{bn(d+ex^2)^{3/2}}{9dx^3} + \frac{be^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3d} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3}$$

output
```
-1/9*b*n*(e*x^2+d)^(3/2)/d/x^3+1/3*b*e^(3/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)
^(1/2))/d-1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/d/x^3-1/3*b*e*n*(e*x^2+d)^(1
/2)/d/x
```

3.260.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 99, normalized size of antiderivative = 0.88

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4} dx = -\frac{\sqrt{d+ex^2}(3a(d+ex^2)+bn(d+4ex^2)) + 3b(d+ex^2)^{3/2}\log(cx^n) - 3be^{3/2}nx^3\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{9dx^3}$$

input
```
Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/9*(Sqrt[d + e*x^2]*(3*a*(d + e*x^2) + b*n*(d + 4*e*x^2)) + 3*b*(d + e*x
^2)^(3/2)*Log[c*x^n] - 3*b*e^(3/2)*n*x^3*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]
])/(d*x^3)
```

3.260.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 104, normalized size of antiderivative = 0.93, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2773, 247, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx$$

$$\Big\downarrow \text{2773}$$

$$\frac{bn\int \frac{(ex^2+d)^{3/2}}{x^4}dx}{3d}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(e\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{224}$$

$$\frac{bn\left(e\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{219}$$

$$\frac{bn\left(e\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3dx^3}$$

input
```
Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-1/3*(d + e*x^2)^(3/2)/x^3 + e*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*ArcTa
nh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])))/(3*d) - ((d + e*x^2)^(3/2)*(a + b*Log[c
*x^n]))/(3*d*x^3)
```

3.260.3.1 Defintions of rubi rules used

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] && !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] && !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

3.260.4 Maple [F]

$$\int \frac{(a+b\ln(c\,x^{n}))\,\sqrt{e\,x^{2}+d}}{x^{4}}dx$$

input
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^4,x)
```

output
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^4,x)
```

3.260.5 Fricas [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 212, normalized size of antiderivative = 1.89

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx$$
$$= \left[\frac{3\,be^{\frac{3}{2}}nx^3\log\left(-2\,ex^2-2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)-2\,(bdn+(4\,ben+3\,ae)x^2+3\,ad+3\,(bex^2+bd)\log(c)+}{18\,dx^3}\right.$$
$$-\frac{3\,b\sqrt{-e}enx^3\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^2+d}}\right)+(bdn+(4\,ben+3\,ae)x^2+3\,ad+3\,(bex^2+bd)\log(c)+3\,(benx^2+bdn}{9\,dx^3}$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^4,x, algorithm="fricas")
```

output
```
[1/18*(3*b*e^(3/2)*n*x^3*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x - d) -
 2*(b*d*n + (4*b*e*n + 3*a*e)*x^2 + 3*a*d + 3*(b*e*x^2 + b*d)*log(c) + 3*(
b*e*n*x^2 + b*d*n)*log(x))*sqrt(e*x^2 + d))/(d*x^3), -1/9*(3*b*sqrt(-e)*e*
n*x^3*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + (b*d*n + (4*b*e*n + 3*a*e)*x^2
+ 3*a*d + 3*(b*e*x^2 + b*d)*log(c) + 3*(b*e*n*x^2 + b*d*n)*log(x))*sqrt(e*
x^2 + d))/(d*x^3)]
```

3.260.6 Sympy [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex^2}}{x^4}\,dx$$

input
```
integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2)/x**4,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**4, x)
```

3.260.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^4,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.260.8 Giac [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^4,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)/x^4, x)
```

3.260.9 Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^4}\,dx = \int \frac{\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))}{x^4}\,dx$$

input
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^4,x)
```

output
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^4, x)
```

3.261 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx$

3.261.1 Optimal result

Integrand size = 25, antiderivative size = 170

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx = \frac{2be^2n\sqrt{d+ex^2}}{15d^2x}+\frac{2ben(d+ex^2)^{3/2}}{45d^2x^3} - \frac{bn(d+ex^2)^{5/2}}{25d^2x^5}-\frac{2be^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{15d^2} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5} + \frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3}$$

output
```
2/45*b*e*n*(e*x^2+d)^(3/2)/d^2/x^3-1/25*b*n*(e*x^2+d)^(5/2)/d^2/x^5-2/15*b
*e^(5/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d^2-1/5*(e*x^2+d)^(3/2)*(a+b
*ln(c*x^n))/d/x^5+2/15*e*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/d^2/x^3+2/15*b*e^
2*n*(e*x^2+d)^(1/2)/d^2/x
```

3.261.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 145, normalized size of antiderivative = 0.85

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx = -\frac{\sqrt{d+ex^2}(bn(9d^2+8dex^2-31e^2x^4)+15a(3d^2+dex^2-2e^2x^4))+15b\sqrt{d+ex^2}(3d^2+dex^2-2e^2x^4)}{225d^2x^5}$$

input
```
Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/225*(Sqrt[d + e*x^2]*(b*n*(9*d^2 + 8*d*e*x^2 - 31*e^2*x^4) + 15*a*(3*d^
2 + d*e*x^2 - 2*e^2*x^4)) + 15*b*Sqrt[d + e*x^2]*(3*d^2 + d*e*x^2 - 2*e^2*
x^4)*Log[c*x^n] + 30*b*e^(5/2)*n*x^5*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(
d^2*x^5)
```

3.261.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 158, normalized size of antiderivative = 0.93, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.280$, Rules used = {2792, 27, 358, 247, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{(3d-2ex^2)\left(ex^2+d\right)^{3/2}}{15d^2x^6}dx+\frac{2e\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(3d-2ex^2)\left(ex^2+d\right)^{3/2}}{x^6}dx}{15d^2}+\frac{2e\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{358}$$

$$\frac{bn\left(-2e\int \frac{(ex^2+d)^{3/2}}{x^4}dx-\frac{3(d+ex^2)^{5/2}}{5x^5}\right)}{15d^2}+\frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \textbf{247}$$

$$\frac{bn\left(-2e\left(e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3(d+ex^2)^{5/2}}{5x^5}\right)}{15d^2}+\frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \textbf{247}$$

$$\frac{bn\left(-2e\left(e\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3(d+ex^2)^{5/2}}{5x^5}\right)}{15d^2}+\frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \textbf{224}$$

$$\frac{bn\left(-2e\left(e\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3(d+ex^2)^{5/2}}{5x^5}\right)}{15d^2}+\frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \textbf{219}$$

$$\frac{2e(d+ex^2)^{3/2}(a+b\log(cx^n))}{15d^2x^3}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{5dx^5}+\frac{bn\left(-2e\left(e\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3(d+ex^2)^{5/2}}{5x^5}\right)}{15d^2}$$

input
```
Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*((-3*(d + e*x^2)^(5/2))/(5*x^5) - 2*e*(-1/3*(d + e*x^2)^(3/2)/x^3 + e
*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]))))/
(15*d^2) - ((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(5*d*x^5) + (2*e*(d + e*
x^2)^(3/2)*(a + b*Log[c*x^n]))/(15*d^2*x^3)
```

3.261. $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx$

3.261.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.261. $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx$

3.261.4 Maple [F]

$$\int \frac{(a+b\ln (c\,x^{n}))\,\sqrt{e\,x^{2}+d}}{x^{6}}dx$$

input
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^6,x)
```

output
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^6,x)
```

3.261.5 Fricas [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 323, normalized size of antiderivative = 1.90

$$\int \frac{\sqrt{d+ex^2}(a+b\log (cx^n))}{x^6}\,dx$$
$$= \left[\frac{15\,be^{\frac{5}{2}}nx^5\log \left(-2\,ex^2+2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)+((31\,be^2n+30\,ae^2)x^4-9\,bd^2n-45\,ad^2-(8\,bden+15}{225\,d^2x}\right.$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^6,x, algorithm="fricas")
```

output
```
[1/225*(15*b*e^(5/2)*n*x^5*log(-2*e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(e)*x - d)
 + ((31*b*e^2*n + 30*a*e^2)*x^4 - 9*b*d^2*n - 45*a*d^2 - (8*b*d*e*n + 15*a
*d*e)*x^2 + 15*(2*b*e^2*x^4 - b*d*e*x^2 - 3*b*d^2)*log(c) + 15*(2*b*e^2*n*
x^4 - b*d*e*n*x^2 - 3*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d^2*x^5), 1/225*(
30*b*sqrt(-e)*e^2*n*x^5*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + ((31*b*e^2*n
+ 30*a*e^2)*x^4 - 9*b*d^2*n - 45*a*d^2 - (8*b*d*e*n + 15*a*d*e)*x^2 + 15*(
2*b*e^2*x^4 - b*d*e*x^2 - 3*b*d^2)*log(c) + 15*(2*b*e^2*n*x^4 - b*d*e*n*x^
2 - 3*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d^2*x^5)]
```

3.261.6 Sympy [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log (cx^n))}{x^6}\,dx = \int \frac{(a+b\log (cx^n))\,\sqrt{d+ex^2}}{x^6}\,dx$$

input
```
integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2)/x**6,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**6, x)
```

3.261.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^6,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.261.8 Giac [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^6}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^6,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)/x^6, x)
```

3.261.9 Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^6}\,dx = \int \frac{\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))}{x^6}\,dx$$

input
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^6,x)
```

output
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^6, x)
```

3.262 $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx$

3.262.1 Optimal result

Integrand size = 25, antiderivative size = 230

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx = -\frac{8be^3n\sqrt{d+ex^2}}{105d^3x} - \frac{8be^2n(d+ex^2)^{3/2}}{315d^3x^3} - \frac{bn(d+ex^2)^{5/2}}{49d^2x^7} + \frac{38ben(d+ex^2)^{5/2}}{1225d^3x^5} + \frac{8be^{7/2}n\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{105d^3} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7} + \frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5} - \frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}$$

output
```
-1/49*b*n*(e*x^2+d)^(3/2)/d/x^7+13/1225*b*e*n*(e*x^2+d)^(3/2)/d^2/x^5+62/1
1025*b*e^2*n*(e*x^2+d)^(3/2)/d^3/x^3+8/105*b*e^(7/2)*n*arctanh(x*e^(1/2)/(
e*x^2+d)^(1/2))/d^3-1/7*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/d/x^7+4/35*e*(e*x^
2+d)^(3/2)*(a+b*ln(c*x^n))/d^2/x^5-8/105*e^2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n
))/d^3/x^3-8/105*b*e^3*n*(e*x^2+d)^(1/2)/d^3/x
```

3.262.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 180, normalized size of antiderivative = 0.78

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx =$$
$$-\frac{\sqrt{d+ex^2}(105a(15d^3+3d^2ex^2-4de^2x^4+8e^3x^6)+bn(225d^3+108d^2ex^2-179de^2x^4+778e^3x^6))+10}{11025d^3x}$$

input
```
Integrate[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
-1/11025*(Sqrt[d + e*x^2]*(105*a*(15*d^3 + 3*d^2*e*x^2 - 4*d*e^2*x^4 + 8*e
^3*x^6) + b*n*(225*d^3 + 108*d^2*e*x^2 - 179*d*e^2*x^4 + 778*e^3*x^6)) + 1
05*b*Sqrt[d + e*x^2]*(15*d^3 + 3*d^2*e*x^2 - 4*d*e^2*x^4 + 8*e^3*x^6)*Log[
c*x^n] - 840*b*e^(7/2)*n*x^7*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(d^3*x^7)
```

3.262.3 Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 217, normalized size of antiderivative = 0.94, number of steps used = 10, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {2792, 27, 1588, 27, 358, 247, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{(ex^2+d)^{3/2}(8e^2x^4-12dex^2+15d^2)}{105d^3x^8}dx - \frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3} + \frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(ex^2+d)^{3/2}(8e^2x^4-12dex^2+15d^2)}{x^8}dx}{105d^3} - \frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3} + \frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5} - \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \text{1588}$$

$$\frac{bn\left(-\frac{\int \frac{2de(57d-28ex^2)(ex^2+d)^{3/2}}{x^6}dx}{7d}-\frac{15d(d+ex^2)^{5/2}}{7x^7}\right)}{105d^3}-\frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}+\frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \; 27$$

$$\frac{bn\left(-\frac{2}{7}e\int \frac{(57d-28ex^2)(ex^2+d)^{3/2}}{x^6}dx-\frac{15d(d+ex^2)^{5/2}}{7x^7}\right)}{105d^3}-\frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}+\frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \; 358$$

$$\frac{bn\left(-\frac{2}{7}e\left(-28e\int \frac{(ex^2+d)^{3/2}}{x^4}dx-\frac{57(d+ex^2)^{5/2}}{5x^5}\right)-\frac{15d(d+ex^2)^{5/2}}{7x^7}\right)}{105d^3}-\frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}+\frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \; 247$$

$$\frac{bn\left(-\frac{2}{7}e\left(-28e\left(e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{57(d+ex^2)^{5/2}}{5x^5}\right)-\frac{15d(d+ex^2)^{5/2}}{7x^7}\right)}{105d^3}-\frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}+\frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \; 247$$

$$\frac{bn\left(-\frac{2}{7}e\left(-28e\left(e\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{57(d+ex^2)^{5/2}}{5x^5}\right)-\frac{15d(d+ex^2)^{5/2}}{7x^7}\right)}{105d^3}-\frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}+\frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \; 224$$

$$\frac{bn\left(-\frac{2}{7}e\left(-28e\left(e\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{57(d+ex^2)^{5/2}}{5x^5}\right)-\frac{15d(d+ex^2)^{5/2}}{7x^7}\right)}{105d^3}-\frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}+\frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \; 219$$

3.262. $\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx$

$$-\frac{8e^2(d+ex^2)^{3/2}(a+b\log(cx^n))}{105d^3x^3}+\frac{4e(d+ex^2)^{3/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{7dx^7}+\frac{bn\left(-\frac{2}{7}e\left(-28e\left(e\left(\sqrt{e}\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{57(d+ex^2)^{5/2}}{5x^5}\right)-\frac{15d(d+ex^2)^{5/2}}{7x^7}\right)}{105d^3}$$

input
```
Int[(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*((-15*d*(d + e*x^2)^(5/2))/(7*x^7) - (2*e*((-57*(d + e*x^2)^(5/2))/(5
*x^5) - 28*e*(-1/3*(d + e*x^2)^(3/2)/x^3 + e*(-(Sqrt[d + e*x^2]/x) + Sqrt[
e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]))))/7))/(105*d^3) - ((d + e*x^2)^(
3/2)*(a + b*Log[c*x^n]))/(7*d*x^7) + (4*e*(d + e*x^2)^(3/2)*(a + b*Log[c*x
^n]))/(35*d^2*x^5) - (8*e^2*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(105*d^3
*x^3)
```

3.262.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.262.4 Maple [F]

$$\int \frac{(a+b\ln(c\,x^n))\,\sqrt{e\,x^2+d}}{x^8}dx$$

input
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^8,x)
```

output
```
int((a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x^8,x)
```

3.262.5 Fricas [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 426, normalized size of antiderivative = 1.85

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx$$

$$= \left[\frac{420\,be^{\frac{7}{2}}nx^7\log\left(-2\,ex^2-2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)-\left(2\,(389\,be^3n+420\,ae^3)x^6+225\,bd^3n-(179\,bde^2n+4\right.}{}\right.$$

$$-\frac{840\,b\sqrt{-e}e^3nx^7\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^2+d}}\right)+\left(2\,(389\,be^3n+420\,ae^3)x^6+225\,bd^3n-(179\,bde^2n+420\,ade^2)x^4+\right.}{}$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^8,x, algorithm="fricas")
```

output
```
[1/11025*(420*b*e^(7/2)*n*x^7*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x -
 d) - (2*(389*b*e^3*n + 420*a*e^3)*x^6 + 225*b*d^3*n - (179*b*d*e^2*n + 42
0*a*d*e^2)*x^4 + 1575*a*d^3 + 9*(12*b*d^2*e*n + 35*a*d^2*e)*x^2 + 105*(8*b
*e^3*x^6 - 4*b*d*e^2*x^4 + 3*b*d^2*e*x^2 + 15*b*d^3)*log(c) + 105*(8*b*e^3
*n*x^6 - 4*b*d*e^2*n*x^4 + 3*b*d^2*e*n*x^2 + 15*b*d^3*n)*log(x))*sqrt(e*x^
2 + d))/(d^3*x^7), -1/11025*(840*b*sqrt(-e)*e^3*n*x^7*arctan(sqrt(-e)*x/sq
rt(e*x^2 + d)) + (2*(389*b*e^3*n + 420*a*e^3)*x^6 + 225*b*d^3*n - (179*b*d
*e^2*n + 420*a*d*e^2)*x^4 + 1575*a*d^3 + 9*(12*b*d^2*e*n + 35*a*d^2*e)*x^2
 + 105*(8*b*e^3*x^6 - 4*b*d*e^2*x^4 + 3*b*d^2*e*x^2 + 15*b*d^3)*log(c) + 1
05*(8*b*e^3*n*x^6 - 4*b*d*e^2*n*x^4 + 3*b*d^2*e*n*x^2 + 15*b*d^3*n)*log(x)
)*sqrt(e*x^2 + d))/(d^3*x^7)]
```

3.262.6 Sympy [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex^2}}{x^8}\,dx$$

input
```
integrate((a+b*ln(c*x**n))*(e*x**2+d)**(1/2)/x**8,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**2)/x**8, x)
```

3.262.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^8,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.262.8 Giac [F]

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx = \int \frac{\sqrt{ex^2+d}(b\log(cx^n)+a)}{x^8}\,dx$$

input
```
integrate((a+b*log(c*x^n))*(e*x^2+d)^(1/2)/x^8,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^2 + d)*(b*log(c*x^n) + a)/x^8, x)
```

3.262.9 Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{x^8}\,dx = \int \frac{\sqrt{e\,x^2+d}\,(a+b\,\ln(c\,x^n))}{x^8}\,dx$$

input
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^8,x)
```

output
```
int(((d + e*x^2)^(1/2)*(a + b*log(c*x^n)))/x^8, x)
```

3.263 $\int x^5(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

3.263.1 Optimal result

Integrand size = 25, antiderivative size = 231

$$\int x^5(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = -\frac{8bd^4n\sqrt{d+ex^2}}{315e^3}-\frac{8bd^3n(d+ex^2)^{3/2}}{945e^3} -\frac{8bd^2n(d+ex^2)^{5/2}}{1575e^3}+\frac{11bdn(d+ex^2)^{7/2}}{441e^3}-\frac{bn(d+ex^2)^{9/2}}{81e^3} +\frac{8bd^{9/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{315e^3}+\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3} -\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}$$

output
```
-8/945*b*d^3*n*(e*x^2+d)^(3/2)/e^3-8/1575*b*d^2*n*(e*x^2+d)^(5/2)/e^3+11/4
41*b*d*n*(e*x^2+d)^(7/2)/e^3-1/81*b*n*(e*x^2+d)^(9/2)/e^3+8/315*b*d^(9/2)*
n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^3+1/5*d^2*(e*x^2+d)^(5/2)*(a+b*ln(c*x
^n))/e^3-2/7*d*(e*x^2+d)^(7/2)*(a+b*ln(c*x^n))/e^3+1/9*(e*x^2+d)^(9/2)*(a+
b*ln(c*x^n))/e^3-8/315*b*d^4*n*(e*x^2+d)^(1/2)/e^3
```

3.263.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 256, normalized size of antiderivative = 1.11

$$\int x^5 \left(d+ex^2\right)^{3/2} (a +b\log \left(cx^n\right))\, dx = \frac{-2520bd^{9/2}n\log(x)+315bn(d+ex^2)^{5/2}\left(8d^2-20dex^2+35e^2x^4\right)\log(x)+\sqrt{d+ex^2}(122}{}$$

input
```
Integrate[x^5*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-2520*b*d^(9/2)*n*Log[x] + 315*b*n*(d + e*x^2)^(5/2)*(8*d^2 - 20*d*e*x^2
+ 35*e^2*x^4)*Log[x] + Sqrt[d + e*x^2]*(1225*e^4*x^8*(9*a - b*n - 9*b*n*Lo
g[x] + 9*b*Log[c*x^n]) + 3*d^2*e^2*x^4*(315*a - 143*b*n + 315*b*(-(n*Log[x
]) + Log[c*x^n])) + 25*d*e^3*x^6*(630*a - 97*b*n + 630*b*(-(n*Log[x]) + Lo
g[c*x^n])) + 2*d^4*(1260*a - 1307*b*n + 1260*b*(-(n*Log[x]) + Log[c*x^n]))
 - d^3*e*x^2*(1260*a - 677*b*n + 1260*b*(-(n*Log[x]) + Log[c*x^n]))) + 252
0*b*d^(9/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(99225*e^3)
```

3.263.3 Rubi [A] (warning: unable to verify)

Time = 0.52 (sec) , antiderivative size = 193, normalized size of antiderivative = 0.84, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.280, Rules used = {2792, 27, 1578, 1192, 25, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5 \left(d+ex^2\right)^{3/2} (a+b\log \left(cx^n\right))\, dx$$

$$\Big\downarrow \; 2792$$

$$-bn\int \frac{\left(ex^2+d\right)^{5/2}\left(35e^2x^4-20dex^2+8d^2\right)}{315e^3x}dx+\frac{d^2\left(d+ex^2\right)^{5/2}(a+b\log \left(cx^n\right))}{5e^3}+\frac{\left(d+ex^2\right)^{9/2}(a+b\log \left(cx^n\right))}{9e^3}-\frac{2d\left(d+ex^2\right)^{7/2}(a+b\log \left(cx^n\right))}{7e^3}$$

$$\Big\downarrow \; 27$$

$$-\frac{bn\int \frac{(ex^2+d)^{5/2}(35e^2x^4-20dex^2+8d^2)}{x}dx}{315e^3}+\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{1578}$$

$$-\frac{bn\int \frac{(ex^2+d)^{5/2}(35e^2x^4-20dex^2+8d^2)}{x^2}dx^2}{630e^3}+\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{1192}$$

$$-\frac{bn\int -\frac{x^{12}(35e^2x^8-90de^2x^4+63d^2e^2)}{d-x^4}d\sqrt{ex^2+d}}{315e^5}+\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{25}$$

$$\frac{bn\int \frac{x^{12}(35e^2x^8-90de^2x^4+63d^2e^2)}{d-x^4}d\sqrt{ex^2+d}}{315e^5}+\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{1584}$$

$$\frac{bn\int \left(-35e^2x^{16}+55de^2x^{12}-8d^2e^2x^8-8d^3e^2x^4-8d^4e^2+\frac{8d^5e^2}{d-x^4}\right)d\sqrt{ex^2+d}}{315e^5}+\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}+\frac{(d+ex^2)^{9/2}(a+b\log(cx^n))}{9e^3}-\frac{2d(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^3}-\frac{bn\left(-8d^{9/2}e^2\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+8d^4e^2\sqrt{d+ex^2}+\frac{8}{3}d^3e^2x^6+\frac{8}{5}d^2e^2x^{10}-\frac{55}{7}de^2x^{14}+\frac{35e^2x^{18}}{9}\right)}{315e^5}$$

input
```
Int[x^5*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

3.263. $\int x^5(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

output
```
-1/315*(b*n*((8*d^3*e^2*x^6)/3 + (8*d^2*e^2*x^10)/5 - (55*d*e^2*x^14)/7 +
(35*e^2*x^18)/9 + 8*d^4*e^2*Sqrt[d + e*x^2] - 8*d^(9/2)*e^2*ArcTanh[Sqrt[d
 + e*x^2]/Sqrt[d]]))/e^5 + (d^2*(d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e
^3) - (2*d*(d + e*x^2)^(7/2)*(a + b*Log[c*x^n]))/(7*e^3) + ((d + e*x^2)^(9
/2)*(a + b*Log[c*x^n]))/(9*e^3)
```

3.263.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1578
```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a
+ b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Int
egerQ[(m - 1)/2]
```

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.263. $\int x^5(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.263.4 Maple [F]

$$\int x^5 \left(e\,x^2+d\right)^{\frac{3}{2}} \left(a+b\ln\left(c\,x^n\right)\right) dx$$

input
```
int(x^5*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^5*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

3.263.5 Fricas [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 514, normalized size of antiderivative = 2.23

$$\int x^5 (d+ex^2)^{3/2} (a+b\log(cx^n))\,dx = \left[\frac{1260\,bd^{\frac{9}{2}}n\log\left(-\frac{ex^2+2\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right) - (1225\,(be^4n-9\,ae^4)x^8 + 25\,(97\,bde^3n-630\,ade}{}\right.$$

$$-\frac{2520\,b\sqrt{-d}d^4n\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex^2+d}}\right) + (1225\,(be^4n-9\,ae^4)x^8 + 25\,(97\,bde^3n-630\,ade^3)x^6 + 2614\,bd^4n-252}{}$$

input
```
integrate(x^5*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[1/99225*(1260*b*d^(9/2)*n*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/
x^2) - (1225*(b*e^4*n - 9*a*e^4)*x^8 + 25*(97*b*d*e^3*n - 630*a*d*e^3)*x^6
 + 2614*b*d^4*n - 2520*a*d^4 + 3*(143*b*d^2*e^2*n - 315*a*d^2*e^2)*x^4 - (
677*b*d^3*e*n - 1260*a*d^3*e)*x^2 - 315*(35*b*e^4*x^8 + 50*b*d*e^3*x^6 + 3
*b*d^2*e^2*x^4 - 4*b*d^3*e*x^2 + 8*b*d^4)*log(c) - 315*(35*b*e^4*n*x^8 + 5
0*b*d*e^3*n*x^6 + 3*b*d^2*e^2*n*x^4 - 4*b*d^3*e*n*x^2 + 8*b*d^4*n)*log(x))
*sqrt(e*x^2 + d))/e^3, -1/99225*(2520*b*sqrt(-d)*d^4*n*arctan(sqrt(-d)/sqr
t(e*x^2 + d)) + (1225*(b*e^4*n - 9*a*e^4)*x^8 + 25*(97*b*d*e^3*n - 630*a*d
*e^3)*x^6 + 2614*b*d^4*n - 2520*a*d^4 + 3*(143*b*d^2*e^2*n - 315*a*d^2*e^2
)*x^4 - (677*b*d^3*e*n - 1260*a*d^3*e)*x^2 - 315*(35*b*e^4*x^8 + 50*b*d*e^
3*x^6 + 3*b*d^2*e^2*x^4 - 4*b*d^3*e*x^2 + 8*b*d^4)*log(c) - 315*(35*b*e^4*
n*x^8 + 50*b*d*e^3*n*x^6 + 3*b*d^2*e^2*n*x^4 - 4*b*d^3*e*n*x^2 + 8*b*d^4*n
)*log(x))*sqrt(e*x^2 + d))/e^3]
```

3.263.6 Sympy [A] (verification not implemented)

Time = 95.55 (sec) , antiderivative size = 1161, normalized size of antiderivative = 5.03

$$\int x^5 \left(d+ex^2\right)^{3/2} \left(a+b\log\left(cx^n\right)\right)\,dx = \text{Too large to display}$$

input
```
integrate(x**5*(e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*Piecewise((8*d**3*sqrt(d + e*x**2)/(105*e**3) - 4*d**2*x**2*sqrt(d + e
*x**2)/(105*e**2) + d*x**4*sqrt(d + e*x**2)/(35*e) + x**6*sqrt(d + e*x**2)
/7, Ne(e, 0)), (sqrt(d)*x**6/6, True)) + a*e*Piecewise((-16*d**4*sqrt(d +
e*x**2)/(315*e**4) + 8*d**3*x**2*sqrt(d + e*x**2)/(315*e**3) - 2*d**2*x**4
*sqrt(d + e*x**2)/(105*e**2) + d*x**6*sqrt(d + e*x**2)/(63*e) + x**8*sqrt(
d + e*x**2)/9, Ne(e, 0)), (sqrt(d)*x**8/8, True)) - b*d*n*Piecewise((-8*d*
*(7/2)*asinh(sqrt(d)/(sqrt(e)*x))/(105*e**3) + 8*d**4/(105*e**(7/2)*x*sqrt
(d/(e*x**2) + 1)) + 8*d**3*x/(105*e**(5/2)*sqrt(d/(e*x**2) + 1)) - 4*d**2*
Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0)),
(sqrt(d)*x**2/2, True))/(105*e**2) + d*Piecewise((-2*d**2*sqrt(d + e*x**2)
/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(
e, 0)), (sqrt(d)*x**4/4, True))/(35*e) + Piecewise((8*d**3*sqrt(d + e*x**2
)/(105*e**3) - 4*d**2*x**2*sqrt(d + e*x**2)/(105*e**2) + d*x**4*sqrt(d + e
*x**2)/(35*e) + x**6*sqrt(d + e*x**2)/7, Ne(e, 0)), (sqrt(d)*x**6/6, True)
)/7, (e > -oo) & (e < oo) & Ne(e, 0)), (sqrt(d)*x**6/36, True)) + b*d*Piec
ewise((8*d**3*sqrt(d + e*x**2)/(105*e**3) - 4*d**2*x**2*sqrt(d + e*x**2)/(
105*e**2) + d*x**4*sqrt(d + e*x**2)/(35*e) + x**6*sqrt(d + e*x**2)/7, Ne(e
, 0)), (sqrt(d)*x**6/6, True))*log(c*x**n) - b*e*n*Piecewise((16*d**(9/2)*
asinh(sqrt(d)/(sqrt(e)*x))/(315*e**4) - 16*d**5/(315*e**(9/2)*x*sqrt(d/(e*
x**2) + 1)) - 16*d**4*x/(315*e**(7/2)*sqrt(d/(e*x**2) + 1)) + 8*d**3*Pi...
```

3.263.7 Maxima [F(-2)]

Exception generated.

$$\int x^5 (d + ex^2)^{3/2} (a + b \log (cx^n)) \, dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^5*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.263.8 Giac [F]

$$\int x^5 \left(d+e x^2\right)^{3/2} (a+b \log (c x^n)) \, dx=\int (e x^2+d)^{\frac{3}{2}} (b \log (c x^n)+a) x^5 \, dx$$

input
```
integrate(x^5*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)*x^5, x)
```

3.263.9 Mupad [F(-1)]

Timed out.

$$\int x^5 \left(d+e x^2\right)^{3/2} (a+b \log (c x^n)) \, dx=\int x^5 \left(e\, x^2+d\right)^{3/2} (a+b\, \ln (c\, x^n)) \, dx$$

input
```
int(x^5*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^5*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

3.264 $\int x^3(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

3.264.1 Optimal result

Integrand size = 25, antiderivative size = 177

$$\int x^3(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = \frac{2bd^3n\sqrt{d+ex^2}}{35e^2}+\frac{2bd^2n(d+ex^2)^{3/2}}{105e^2}+\frac{2bdn(d+ex^2)^{5/2}}{175e^2}-\frac{bn(d+ex^2)^{7/2}}{49e^2}-\frac{2bd^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{35e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}$$

output
```
2/105*b*d^2*n*(e*x^2+d)^(3/2)/e^2+2/175*b*d*n*(e*x^2+d)^(5/2)/e^2-1/49*b*n
*(e*x^2+d)^(7/2)/e^2-2/35*b*d^(7/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^2
-1/5*d*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e^2+1/7*(e*x^2+d)^(7/2)*(a+b*ln(c*x
^n))/e^2+2/35*b*d^3*n*(e*x^2+d)^(1/2)/e^2
```

3.264.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 227, normalized size of antiderivative = 1.28

$$\int x^3(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = \frac{2bd^{7/2}n\log(x)}{35e^2}-\frac{bn(2d-5ex^2)(d+ex^2)^{5/2}\log(x)}{35e^2}+\sqrt{d+ex^2}\left(\frac{1}{49}ex^6(7a-bn+7b(-n\log(x)+\log(cx^n)))+\frac{d^2x^2(105a-71bn+105b(-n\log(x)+\log(cx^n)))}{3675e}\right.$$

input
```
Integrate[x^3*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(2*b*d^(7/2)*n*Log[x])/(35*e^2) - (b*n*(2*d - 5*e*x^2)*(d + e*x^2)^(5/2)*L
og[x])/(35*e^2) + Sqrt[d + e*x^2]*((e*x^6*(7*a - b*n + 7*b*(-(n*Log[x]) +
Log[c*x^n])))/49 + (d^2*x^2*(105*a - 71*b*n + 105*b*(-(n*Log[x]) + Log[c*x
^n])))/(3675*e) - (d^3*(210*a - 247*b*n + 210*b*(-(n*Log[x]) + Log[c*x^n])
))/(3675*e^2) + (d*x^4*(280*a - 61*b*n + 280*b*(-(n*Log[x]) + Log[c*x^n]))
)/1225) - (2*b*d^(7/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(35*e^2)
```

3.264.3 Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 161, normalized size of antiderivative = 0.91, number of steps used = 10, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {2792, 27, 354, 90, 60, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3 \left(d+ex^2\right)^{3/2} (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{(2d-5ex^2)\left(ex^2+d\right)^{5/2}}{35e^2x}dx+\frac{\left(d+ex^2\right)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(2d-5ex^2)\left(ex^2+d\right)^{5/2}}{x}dx}{35e^2}+\frac{\left(d+ex^2\right)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \text{354}$$

$$\frac{bn\int \frac{(2d-5ex^2)\left(ex^2+d\right)^{5/2}}{x^2}dx^2}{70e^2}+\frac{\left(d+ex^2\right)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \text{90}$$

$$\frac{bn\left(2d\int \frac{\left(ex^2+d\right)^{5/2}}{x^2}dx^2-\frac{10}{7}\left(d+ex^2\right)^{7/2}\right)}{70e^2}+\frac{\left(d+ex^2\right)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \; 60$$

$$\frac{bn\left(2d\left(d\int \frac{(ex^2+d)^{3/2}}{x^2}dx^2+\frac{2}{5}(d+ex^2)^{5/2}\right)-\frac{10}{7}(d+ex^2)^{7/2}\right)}{70e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \; 60$$

$$\frac{bn\left(2d\left(d\left(d\int \frac{\sqrt{ex^2+d}}{x^2}dx^2+\frac{2}{3}(d+ex^2)^{3/2}\right)+\frac{2}{5}(d+ex^2)^{5/2}\right)-\frac{10}{7}(d+ex^2)^{7/2}\right)}{70e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \; 60$$

$$\frac{bn\left(2d\left(d\left(d\left(d\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)+\frac{2}{5}(d+ex^2)^{5/2}\right)-\frac{10}{7}(d+ex^2)^{7/2}\right)}{70e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \; 73$$

$$\frac{bn\left(2d\left(d\left(d\left(d\left(\frac{2d\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)+\frac{2}{5}(d+ex^2)^{5/2}\right)-\frac{10}{7}(d+ex^2)^{7/2}\right)}{70e^2}+\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}$$

$$\Big\downarrow \; 221$$

$$\frac{(d+ex^2)^{7/2}(a+b\log(cx^n))}{7e^2}-\frac{d(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^2}+\frac{bn\left(2d\left(d\left(d\left(2\sqrt{d+ex^2}-2\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)+\frac{2}{5}(d+ex^2)^{5/2}\right)-\frac{10}{7}(d+ex^2)^{7/2}\right)}{70e^2}$$

input
```
Int[x^3*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(b*n*((-10*(d + e*x^2)^(7/2))/7 + 2*d*((2*(d + e*x^2)^(5/2))/5 + d*((2*(d
+ e*x^2)^(3/2))/3 + d*(2*Sqrt[d + e*x^2] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x^
2]/Sqrt[d]])))))/(70*e^2) - (d*(d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e^
2) + ((d + e*x^2)^(7/2)*(a + b*Log[c*x^n]))/(7*e^2)
```

3.264. $\int x^3(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

3.264.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

3.264. $\int x^3(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.264.4 Maple [F]

$$\int x^3 \left(e\,x^2+d\right)^{\frac{3}{2}} \left(a+b\ln\left(c\,x^n\right)\right) dx$$

input
```
int(x^3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

3.264.5 Fricas [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 409, normalized size of antiderivative = 2.31

$$\int x^3\left(d+ex^2\right)^{3/2}(a+b\log\left(cx^n\right))\,dx = \left[\frac{105\,bd^{\frac{7}{2}}n\log\left(-\frac{ex^2-2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(75\,(be^3n-7\,ae^3)x^6-247\,bd^3n+3\,(61\,bde^2n-2}{}\right.$$

input
```
integrate(x^3*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[1/3675*(105*b*d^(7/2)*n*log(-(e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^
2) - (75*(b*e^3*n - 7*a*e^3)*x^6 - 247*b*d^3*n + 3*(61*b*d*e^2*n - 280*a*d
*e^2)*x^4 + 210*a*d^3 + (71*b*d^2*e*n - 105*a*d^2*e)*x^2 - 105*(5*b*e^3*x^
6 + 8*b*d*e^2*x^4 + b*d^2*e*x^2 - 2*b*d^3)*log(c) - 105*(5*b*e^3*n*x^6 + 8
*b*d*e^2*n*x^4 + b*d^2*e*n*x^2 - 2*b*d^3*n)*log(x))*sqrt(e*x^2 + d))/e^2,
1/3675*(210*b*sqrt(-d)*d^3*n*arctan(sqrt(-d)/sqrt(e*x^2 + d)) - (75*(b*e^3
*n - 7*a*e^3)*x^6 - 247*b*d^3*n + 3*(61*b*d*e^2*n - 280*a*d*e^2)*x^4 + 210
*a*d^3 + (71*b*d^2*e*n - 105*a*d^2*e)*x^2 - 105*(5*b*e^3*x^6 + 8*b*d*e^2*x
^4 + b*d^2*e*x^2 - 2*b*d^3)*log(c) - 105*(5*b*e^3*n*x^6 + 8*b*d*e^2*n*x^4
+ b*d^2*e*n*x^2 - 2*b*d^3*n)*log(x))*sqrt(e*x^2 + d))/e^2]
```

3.264.6 Sympy [A] (verification not implemented)

Time = 48.94 (sec) , antiderivative size = 845, normalized size of antiderivative = 4.77

$$\int x^3 (d + ex^2)^{3/2} (a + b \log (cx^n)) \, dx = \text{Too large to display}$$

input
```
integrate(x**3*(e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*Piecewise((-2*d**2*sqrt(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d + e*x**2
)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, True)) + a
*e*Piecewise((8*d**3*sqrt(d + e*x**2)/(105*e**3) - 4*d**2*x**2*sqrt(d + e*
x**2)/(105*e**2) + d*x**4*sqrt(d + e*x**2)/(35*e) + x**6*sqrt(d + e*x**2)/
7, Ne(e, 0)), (sqrt(d)*x**6/6, True)) - b*d*n*Piecewise((2*d**(5/2)*asinh(
sqrt(d)/(sqrt(e)*x))/(15*e**2) - 2*d**3/(15*e**(5/2)*x*sqrt(d/(e*x**2) + 1
)) - 2*d**2*x/(15*e**(3/2)*sqrt(d/(e*x**2) + 1)) + d*Piecewise((d*sqrt(d +
 e*x**2)/(3*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True
))/(15*e) + Piecewise((-2*d**2*sqrt(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d
+ e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, Tr
ue))/5, (e > -oo) & (e < oo) & Ne(e, 0)), (sqrt(d)*x**4/16, True)) + b*d*P
iecewise((-2*d**2*sqrt(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15
*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, True))*log(c*x*
*n) - b*e*n*Piecewise((-8*d**(7/2)*asinh(sqrt(d)/(sqrt(e)*x))/(105*e**3) +
 8*d**4/(105*e**(7/2)*x*sqrt(d/(e*x**2) + 1)) + 8*d**3*x/(105*e**(5/2)*sqr
t(d/(e*x**2) + 1)) - 4*d**2*Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqr
t(d + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))/(105*e**2) + d*Piecewi
se((-2*d**2*sqrt(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) +
x**4*sqrt(d + e*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, True))/(35*e) + Piece
wise((8*d**3*sqrt(d + e*x**2)/(105*e**3) - 4*d**2*x**2*sqrt(d + e*x**2)...
```

3.264.7 Maxima [F(-2)]

Exception generated.

$$\int x^3 (d + ex^2)^{3/2} (a + b \log (cx^n)) \, dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^3*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.264.8 Giac [F]

$$\int x^3 \left(d+ex^2\right)^{3/2} (a+b\log\left(cx^n\right))\,dx=\int \left(ex^2+d\right)^{\frac{3}{2}}(b\log\left(cx^n\right)+a)x^3\,dx$$

input
```
integrate(x^3*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)*x^3, x)
```

3.264.9 Mupad [F(-1)]

Timed out.

$$\int x^3 \left(d+ex^2\right)^{3/2} (a+b\log\left(cx^n\right))\,dx=\int x^3\,\left(e\,x^2+d\right)^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^3*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^3*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

3.265 $\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

3.265.1 Optimal result

Integrand size = 23, antiderivative size = 125

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = -\frac{bd^2n\sqrt{d+ex^2}}{5e}-\frac{bdn(d+ex^2)^{3/2}}{15e}-\frac{bn(d+ex^2)^{5/2}}{25e}+\frac{bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{5e}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e}$$

output
```
-1/15*b*d*n*(e*x^2+d)^(3/2)/e-1/25*b*n*(e*x^2+d)^(5/2)/e+1/5*b*d^(5/2)*n*a
rctanh((e*x^2+d)^(1/2)/d^(1/2))/e+1/5*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e-1/
5*b*d^2*n*(e*x^2+d)^(1/2)/e
```

3.265.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 181, normalized size of antiderivative = 1.45

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = -\frac{bd^{5/2}n\log(x)}{5e}+\frac{bn(d+ex^2)^{5/2}\log(x)}{5e}+\sqrt{d+ex^2}\left(\frac{1}{25}ex^4(5a-bn+5b(-n\log(x)+\log(cx^n)))+\frac{d^2(15a-23bn+15b(-n\log(x)+\log(cx^n)))}{75e}+\frac{1}{75}\right.$$

input
```
Integrate[x*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
-1/5*(b*d^(5/2)*n*Log[x])/e + (b*n*(d + e*x^2)^(5/2)*Log[x])/(5*e) + Sqrt[
d + e*x^2]*((e*x^4*(5*a - b*n + 5*b*(-(n*Log[x]) + Log[c*x^n])))/25 + (d^2
*(15*a - 23*b*n + 15*b*(-(n*Log[x]) + Log[c*x^n])))/(75*e) + (d*x^2*(30*a
- 11*b*n + 30*b*(-(n*Log[x]) + Log[c*x^n])))/75) + (b*d^(5/2)*n*Log[d + Sq
rt[d]*Sqrt[d + e*x^2]])/(5*e)
```

3.265.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.90, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {2776, 243, 60, 60, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \ 2776$$

$$\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e}-\frac{bn\int\frac{(ex^2+d)^{5/2}}{x}dx}{5e}$$

$$\Big\downarrow \ 243$$

$$\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e}-\frac{bn\int\frac{(ex^2+d)^{5/2}}{x^2}dx^2}{10e}$$

$$\Big\downarrow \ 60$$

$$\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e}-\frac{bn\left(d\int\frac{(ex^2+d)^{3/2}}{x^2}dx^2+\frac{2}{5}(d+ex^2)^{5/2}\right)}{10e}$$

$$\Big\downarrow \ 60$$

$$\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e}-\frac{bn\left(d\left(d\int\frac{\sqrt{ex^2+d}}{x^2}dx^2+\frac{2}{3}(d+ex^2)^{3/2}\right)+\frac{2}{5}(d+ex^2)^{5/2}\right)}{10e}$$

$$\Big\downarrow \ 60$$

$$\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e}-\frac{bn\left(d\left(d\left(d\int\frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)+\frac{2}{3}(d+ex^2)^{3/2}\right)+\frac{2}{5}(d+ex^2)^{5/2}\right)}{10e}$$

$$\Big\downarrow \ 73$$

$$\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e}-\frac{bn\left(d\left(d\left(\frac{2d\int\frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)+\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)+\frac{2}{5}\left(d+ex^2\right)^{5/2}\right)}{10e}$$

$$\Big\downarrow \text{ 221}$$

$$\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{5e}-\frac{bn\left(d\left(d\left(2\sqrt{d+ex^2}-2\sqrt{d}\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)+\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)+\frac{2}{5}\left(d+ex^2\right)^{5/2}\right)}{10e}$$

input
```
Int[x*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
-1/10*(b*n*((2*(d + e*x^2)^(5/2))/5 + d*((2*(d + e*x^2)^(3/2))/3 + d*(2*Sq
rt[d + e*x^2] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]))))/e + ((d + e
*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e)
```

3.265.3.1 Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

3.265. $\int x(d+ex^2)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx$

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

3.265.4 Maple [F]

$$\int x\left(e\,x^{2}+d\right)^{\frac{3}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)dx$$

input
```
int(x*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

3.265.5 Fricas [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 304, normalized size of antiderivative = 2.43

$$\int x\left(d+ex^2\right)^{3/2}(a+b\log\left(cx^n\right))\,dx = \left[\frac{15\,bd^{\frac{5}{2}}n\log\left(-\frac{ex^2+2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-2\,(3\,(be^2n-5\,ae^2)x^4+23\,bd^2n-15\,ad^2+(11\,bde\right.$$

$$-\frac{15\,b\sqrt{-d}d^2n\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex^2+d}}\right)+(3\,(be^2n-5\,ae^2)x^4+23\,bd^2n-15\,ad^2+(11\,bden-30\,ade)x^2-15\,(be^2x}{75\,e}$$

input
```
integrate(x*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
[1/150*(15*b*d^(5/2)*n*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2)
 - 2*(3*(b*e^2*n - 5*a*e^2)*x^4 + 23*b*d^2*n - 15*a*d^2 + (11*b*d*e*n - 30
*a*d*e)*x^2 - 15*(b*e^2*x^4 + 2*b*d*e*x^2 + b*d^2)*log(c) - 15*(b*e^2*n*x^
4 + 2*b*d*e*n*x^2 + b*d^2*n)*log(x))*sqrt(e*x^2 + d))/e, -1/75*(15*b*sqrt(
-d)*d^2*n*arctan(sqrt(-d)/sqrt(e*x^2 + d)) + (3*(b*e^2*n - 5*a*e^2)*x^4 +
23*b*d^2*n - 15*a*d^2 + (11*b*d*e*n - 30*a*d*e)*x^2 - 15*(b*e^2*x^4 + 2*b*
d*e*x^2 + b*d^2)*log(c) - 15*(b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*log(x
))*sqrt(e*x^2 + d))/e]
```

3.265.6 Sympy [A] (verification not implemented)

Time = 30.64 (sec) , antiderivative size = 573, normalized size of antiderivative = 4.58

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = ad\left(\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)$$

$$+ae\left(\begin{cases}-\frac{2d^2\sqrt{d+ex^2}}{15e^2}+\frac{dx^2\sqrt{d+ex^2}}{15e}+\frac{x^4\sqrt{d+ex^2}}{5} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^4}{4} & \text{otherwise}\end{cases}\right)$$

$$-bdn\left(\begin{cases}-\frac{d^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{3e}+\frac{d^2}{3e^{\frac{3}{2}}x\sqrt{\frac{d}{ex^2}+1}}+\frac{dx}{3\sqrt{e}\sqrt{\frac{d}{ex^2}+1}}+\frac{\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}}{3} & \text{for } e>-\infty\wedge e<\\ \frac{\sqrt{d}x^2}{4} & \text{otherwise}\end{cases}\right.$$

$$+bd\left(\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

$$-ben\left(\begin{cases}\frac{2d^{\frac{5}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{15e^2}-\frac{2d^3}{15e^{\frac{5}{2}}x\sqrt{\frac{d}{ex^2}+1}}-\frac{2d^2x}{15e^{\frac{3}{2}}\sqrt{\frac{d}{ex^2}+1}}+\frac{d\left(\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)}{15e}+\frac{\begin{cases}-\frac{2d^2\sqrt{d+ex^2}}{15e^2} \\ \frac{\sqrt{d}x^4}{4}\end{cases}}{} \\ \frac{\sqrt{d}x^4}{16}\end{cases}\right.$$

$$+be\left(\begin{cases}-\frac{2d^2\sqrt{d+ex^2}}{15e^2}+\frac{dx^2\sqrt{d+ex^2}}{15e}+\frac{x^4\sqrt{d+ex^2}}{5} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^4}{4} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
a*d*Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0
)), (sqrt(d)*x**2/2, True)) + a*e*Piecewise((-2*d**2*sqrt(d + e*x**2)/(15*
e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(e, 0)
), (sqrt(d)*x**4/4, True)) - b*d*n*Piecewise((-d**(3/2)*asinh(sqrt(d)/(sqr
t(e)*x))/(3*e) + d**2/(3*e**(3/2)*x*sqrt(d/(e*x**2) + 1)) + d*x/(3*sqrt(e)
*sqrt(d/(e*x**2) + 1)) + Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d
 + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))/3, (e > -oo) & (e < oo) &
 Ne(e, 0)), (sqrt(d)*x**2/4, True)) + b*d*Piecewise((d*sqrt(d + e*x**2)/(3
*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))*log(c*x*
*n) - b*e*n*Piecewise((2*d**(5/2)*asinh(sqrt(d)/(sqrt(e)*x))/(15*e**2) - 2
*d**3/(15*e**(5/2)*x*sqrt(d/(e*x**2) + 1)) - 2*d**2*x/(15*e**(3/2)*sqrt(d/
(e*x**2) + 1)) + d*Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d + e*x
**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))/(15*e) + Piecewise((-2*d**2*sqr
t(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e
*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, True))/5, (e > -oo) & (e < oo) & Ne(
e, 0)), (sqrt(d)*x**4/16, True)) + b*e*Piecewise((-2*d**2*sqrt(d + e*x**2)
/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(d + e*x**2)/5, Ne(
e, 0)), (sqrt(d)*x**4/4, True))*log(c*x**n)
```

3.265.7 Maxima [F(-2)]

Exception generated.

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.265.8 Giac [F]

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx=\int (ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)x\,dx$$

input
```
integrate(x*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)*x, x)
```

3.265.9 Mupad [F(-1)]

Timed out.

$$\int x(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx=\int x\left(e\,x^2+d\right)^{3/2}(a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

3.266 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx$

3.266.1 Optimal result

Integrand size = 25, antiderivative size = 260

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx = -\frac{4}{3}bdn\sqrt{d+ex^2}-\frac{1}{9}bn(d+ex^2)^{3/2}+\frac{4}{3}bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+\frac{1}{2}bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2+\frac{1}{3}\left(3d\sqrt{d+ex^2}+(d+ex^2)^{3/2}-3d^{3/2}\operatorname{arcta}\right.$$

output
```
-1/9*b*n*(e*x^2+d)^(3/2)+4/3*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))+
1/2*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))^2-b*d^(3/2)*n*arctanh((e*
x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))-1/2*b*d^(3/2
)*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))-4/3*b*d*n*(e*x^2+d)^(
1/2)+1/3*(a+b*ln(c*x^n))*((e*x^2+d)^(3/2)-3*d^(3/2)*arctanh((e*x^2+d)^(1/2
)/d^(1/2))+3*d*(e*x^2+d)^(1/2))
```

3.266.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.50 (sec) , antiderivative size = 301, normalized size of antiderivative = 1.16

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx = \frac{benx^2\sqrt{d+ex^2}\left(-\frac{1}{4}\,{}_3F_2\left(-\frac{1}{2},1,1;2,2;-\frac{ex^2}{d}\right)+\frac{d\left(-1+\left(1+\frac{ex^2}{d}\right)^{3/2}\right)\log(x)}{3ex^2}\right)}{\sqrt{1+\frac{ex^2}{d}}} + \frac{bdn\sqrt{d+ex^2}\left(-\,{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{d}{ex^2}\right)+\sqrt{1+\frac{d}{ex^2}}\log(x)-\frac{\sqrt{d}\,\text{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\log(x)}{\sqrt{e}x}\right)}{\sqrt{1+\frac{d}{ex^2}}} + \frac{1}{3}\sqrt{d+ex^2}(4d+ex^2)(a-bn\log(x)+b\log(cx^n)) + d^{3/2}\log(x)(a-bn\log(x)+b\log(cx^n)) - d^{3/2}(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(b*e*n*x^2*Sqrt[d + e*x^2]*(-1/4*HypergeometricPFQ[{-1/2, 1, 1}, {2, 2}, -
((e*x^2)/d)] + (d*(-1 + (1 + (e*x^2)/d)^(3/2))*Log[x])/(3*e*x^2)))/Sqrt[1
+ (e*x^2)/d] + (b*d*n*Sqrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/
2}, {1/2, 1/2}, -(d/(e*x^2))] + Sqrt[1 + d/(e*x^2)]*Log[x] - (Sqrt[d]*ArcS
inh[Sqrt[d]/(Sqrt[e]*x)]*Log[x])/(Sqrt[e]*x)))/Sqrt[1 + d/(e*x^2)] + (Sqrt
[d + e*x^2]*(4*d + e*x^2)*(a - b*n*Log[x] + b*Log[c*x^n]))/3 + d^(3/2)*Log
[x]*(a - b*n*Log[x] + b*Log[c*x^n]) - d^(3/2)*(a - b*n*Log[x] + b*Log[c*x^
n])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]]
```

3.266.3 Rubi [A] (verified)

Time = 0.66 (sec) , antiderivative size = 252, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx$$

$$\Big\downarrow \; 2790$$

$$\frac{1}{3}\left(-3d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+3d\sqrt{d+ex^2}+\left(d+ex^2\right)^{3/2}\right)\left(a+b\log\left(cx^n\right)\right)-$$
$$bn\int\left(-\frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)d^{3/2}}{x}+\frac{\sqrt{ex^2+d}d}{x}+\frac{\left(ex^2+d\right)^{3/2}}{3x}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{3}\left(-3d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+3d\sqrt{d+ex^2}+\left(d+ex^2\right)^{3/2}\right)\left(a+b\log\left(cx^n\right)\right)-$$
$$bn\left(-\frac{1}{2}d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\frac{4}{3}d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex}}\right.\right.$$

input
```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
((3*d*Sqrt[d + e*x^2] + (d + e*x^2)^(3/2) - 3*d^(3/2)*ArcTanh[Sqrt[d + e*x
^2]/Sqrt[d]])*(a + b*Log[c*x^n]))/3 - b*n*((4*d*Sqrt[d + e*x^2])/3 + (d +
e*x^2)^(3/2)/9 - (4*d^(3/2)*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/3 - (d^(3/2)
*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]^2)/2 + d^(3/2)*ArcTanh[Sqrt[d + e*x^2]/S
qrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])] + (d^(3/2)*PolyLog[2,
 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/2)
```

3.266.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

3.266.4 Maple [F]

$$\int \frac{\left(e\,x^{2}+d\right)^{\frac{3}{2}} \left(a+b\ln \left(c\,x^{n}\right)\right)}{x}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

3.266.5 Fricas [F]

$$\int \frac{(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
integral(((b*e*x^2 + b*d)*sqrt(e*x^2 + d)*log(c*x^n) + (a*e*x^2 + a*d)*sqr
t(e*x^2 + d))/x, x)
```

3.266.6 Sympy [F]

$$\int \frac{(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{x}\,dx = \int \frac{(a+b\log(cx^n))\,(d+ex^2)^{\frac{3}{2}}}{x}\,dx$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x, x)
```

3.266.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.266.8 Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x, x)
```

3.266.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(e\,x^2+d)^{3/2}\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x, x)
```

3.267 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx$

3.267.1 Optimal result

Integrand size = 25, antiderivative size = 295

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = -ben\sqrt{d+ex^2}-\frac{bdn\sqrt{d+ex^2}}{4x^2} + \frac{3}{4}b\sqrt{d}en\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+\frac{3}{4}b\sqrt{d}en\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2 + \frac{3}{2}e\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{2x^2} - \frac{3}{2}\sqrt{d}e\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n)) - \frac{3}{2}b\sqrt{d}en\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right) - \frac{3}{4}b\sqrt{d}en\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)$$

output
```
-1/2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^2+3/4*b*e*n*arctanh((e*x^2+d)^(1/2)
/d^(1/2))*d^(1/2)+3/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))^2*d^(1/2)-3/2
*e*arctanh((e*x^2+d)^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*d^(1/2)-3/2*b*e*n*arct
anh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))*d^(1/
2)-3/4*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))*d^(1/2)-b*e*
n*(e*x^2+d)^(1/2)-1/4*b*d*n*(e*x^2+d)^(1/2)/x^2+3/2*e*(a+b*ln(c*x^n))*(e*x
^2+d)^(1/2)
```

3.267.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.59 (sec) , antiderivative size = 349, normalized size of antiderivative = 1.18

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \frac{ben\sqrt{d+ex^2}\left(-{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{d}{ex^2}\right)+\sqrt{1+\frac{d}{ex^2}}\log(x)-\frac{\sqrt{d}\cdots}{\cdots}\right.}{\sqrt{1+\frac{d}{ex^2}}}$$
$$-\frac{b\sqrt{d}n\sqrt{d+ex^2}\left(2\sqrt{d}\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{d}{ex^2}\right)+\left(\sqrt{d}\sqrt{1+\frac{d}{ex^2}}+\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\right)(1+2\log(x))\right)}{4\sqrt{1+\frac{d}{ex^2}}x^2}$$
$$-\frac{(d-2ex^2)\sqrt{d+ex^2}(a-bn\log(x)+b\log(cx^n))}{2x^2}+\frac{3}{2}\sqrt{d}e\log(x)(a-bn\log(x)+b\log(cx^n))$$
$$-\frac{3}{2}\sqrt{d}e(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*e*n*Sqrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/2}, {1/2, 1/2},
 -(d/(e*x^2))] + Sqrt[1 + d/(e*x^2)]*Log[x] - (Sqrt[d]*ArcSinh[Sqrt[d]/(Sq
rt[e]*x)]*Log[x])/(Sqrt[e]*x)))/Sqrt[1 + d/(e*x^2)] - (b*Sqrt[d]*n*Sqrt[d
+ e*x^2]*(2*Sqrt[d]*HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2, 3/2}, -(d/(e*
x^2))] + (Sqrt[d]*Sqrt[1 + d/(e*x^2)] + Sqrt[e]*x*ArcSinh[Sqrt[d]/(Sqrt[e]
*x)])*(1 + 2*Log[x])))/(4*Sqrt[1 + d/(e*x^2)]*x^2) - ((d - 2*e*x^2)*Sqrt[d
 + e*x^2]*(a - b*n*Log[x] + b*Log[c*x^n]))/(2*x^2) + (3*Sqrt[d]*e*Log[x]*(
a - b*n*Log[x] + b*Log[c*x^n]))/2 - (3*Sqrt[d]*e*(a - b*n*Log[x] + b*Log[c
*x^n])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/2
```

3.267.3 Rubi [A] (verified)

Time = 0.75 (sec) , antiderivative size = 288, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{3\sqrt{d}e\operatorname{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)x^2+(d-2ex^2)\sqrt{ex^2+d}}{2x^3}dx-\frac{3}{2}\sqrt{d}e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{2x^2}+\frac{3}{2}e\sqrt{d+ex^2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}bn\int \frac{3\sqrt{d}e\operatorname{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)x^2+(d-2ex^2)\sqrt{ex^2+d}}{x^3}dx-\frac{3}{2}\sqrt{d}e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{2x^2}+\frac{3}{2}e\sqrt{d+ex^2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{2}bn\int \left(\frac{\sqrt{ex^2+d}d}{x^3}+\frac{3e\operatorname{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)\sqrt{d}}{x}-\frac{2e\sqrt{ex^2+d}}{x}\right)dx-\frac{3}{2}\sqrt{d}e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{2x^2}+\frac{3}{2}e\sqrt{d+ex^2}(a+b\log(cx^n))$$

$$\Big\downarrow \text{2009}$$

$$-\frac{3}{2}\sqrt{d}e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{2x^2}+\frac{3}{2}e\sqrt{d+ex^2}(a+b\log(cx^n))+\frac{1}{2}bn\left(\frac{3}{2}\sqrt{d}e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2+\frac{3}{2}\sqrt{d}e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)-3\sqrt{d}e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+e}}\right.\right.$$

input
```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^3,x]
```

3.267. $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx$

output
```
(3*e*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/2 - ((d + e*x^2)^(3/2)*(a + b*Log
[c*x^n]))/(2*x^2) - (3*Sqrt[d]*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*(a + b*L
og[c*x^n]))/2 + (b*n*(-2*e*Sqrt[d + e*x^2] - (d*Sqrt[d + e*x^2])/(2*x^2) +
 (3*Sqrt[d]*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/2 + (3*Sqrt[d]*e*ArcTanh[S
qrt[d + e*x^2]/Sqrt[d]]^2)/2 - 3*Sqrt[d]*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]
]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])] - (3*Sqrt[d]*e*PolyLog[2, 1
 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/2))/2
```

3.267.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.267.4 Maple [F]

$$\int \frac{(e\,x^2+d)^{\frac{3}{2}}\,(a+b\ln(c\,x^n))}{x^3}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^3,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^3,x)
```

3.267.5 Fricas [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
integral(((b*e*x^2 + b*d)*sqrt(e*x^2 + d)*log(c*x^n) + (a*e*x^2 + a*d)*sqr
t(e*x^2 + d))/x^3, x)
```

3.267.6 Sympy [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(a+b\log(cx^n))(d+ex^2)^{\frac{3}{2}}}{x^3}\,dx$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**3, x)
```

3.267.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.267.8 Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x^3, x)
```

3.267.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(e\,x^2+d)^{3/2}\,(a+b\,\ln(c\,x^n))}{x^3}\,dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^3,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^3, x)
```

3.268 $\int x^2(d+ex^2)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx$

3.268.1 Optimal result

Integrand size = 25, antiderivative size = 464

$$\int x^2\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{11bd^2nx\sqrt{d+ex^2}}{192e}-\frac{23}{288}bdnx^3\sqrt{d+ex^2}-\frac{1}{36}benx^5\sqrt{d+ex^2}-\frac{bd^{5/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{192e^{3/2}\sqrt{1+\frac{ex^2}{d}}}-\frac{bd^{5/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{32e^{3/2}\sqrt{1+\frac{ex^2}{d}}}+\frac{bd^{5/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{16e^{3/2}\sqrt{1+\frac{ex^2}{d}}}+\frac{d^2x\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right)}{16e}+\frac{1}{8}dx^3\sqrt{d+ex^2}\left(a+b\log\left(cx^n\right)\right)+\frac{1}{6}x^3\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)-\frac{d^{5/2}\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\left(a+b\log\left(c\right.\right.}{16e^{3/2}\sqrt{1+\frac{ex^2}{d}}}$$

output
```
1/6*x^3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))-11/192*b*d^2*n*x*(e*x^2+d)^(1/2)/e
-23/288*b*d*n*x^3*(e*x^2+d)^(1/2)-1/36*b*e*n*x^5*(e*x^2+d)^(1/2)+1/16*d^2*
x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e+1/8*d*x^3*(a+b*ln(c*x^n))*(e*x^2+d)^(1
/2)-1/192*b*d^(5/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*(e*x^2+d)^(1/2)/e^(3/2)/(
1+e*x^2/d)^(1/2)-1/32*b*d^(5/2)*n*arcsinh(x*e^(1/2)/d^(1/2))^2*(e*x^2+d)^(
1/2)/e^(3/2)/(1+e*x^2/d)^(1/2)+1/16*b*d^(5/2)*n*arcsinh(x*e^(1/2)/d^(1/2))
*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(e*x^2+d)^(1/2)/e^(3/2)/(1+
e*x^2/d)^(1/2)-1/16*d^(5/2)*arcsinh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*(e*
x^2+d)^(1/2)/e^(3/2)/(1+e*x^2/d)^(1/2)+1/32*b*d^(5/2)*n*polylog(2,(x*e^(1/
2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(e*x^2+d)^(1/2)/e^(3/2)/(1+e*x^2/d)^(1/2)
```

3.268.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.63 (sec) , antiderivative size = 331, normalized size of antiderivative = 0.71

$$\int x^2\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))\,dx = \frac{-400bde^{3/2}nx^3\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)-144be^{5/2}nx^5\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{5}{2},\frac{5}{2};\right.}{}$$

input
```
Integrate[x^2*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-400*b*d*e^(3/2)*n*x^3*Sqrt[d + e*x^2]*HypergeometricPFQ[{-1/2, 3/2, 3/2}
, {5/2, 5/2}, -((e*x^2)/d)] - 144*b*e^(5/2)*n*x^5*Sqrt[d + e*x^2]*Hypergeo
metricPFQ[{-1/2, 5/2, 5/2}, {7/2, 7/2}, -((e*x^2)/d)] - 75*(3*b*d^(5/2)*n*
Sqrt[d + e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[x] + Sqrt[1 + (e*x^2)/d]*
(-(a*Sqrt[e]*x*Sqrt[d + e*x^2]*(3*d^2 + 14*d*e*x^2 + 8*e^2*x^4)) + 3*d^3*(
a - b*n*Log[x])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]] - b*Log[c*x^n]*(Sqrt[e]
*x*Sqrt[d + e*x^2]*(3*d^2 + 14*d*e*x^2 + 8*e^2*x^4) - 3*d^3*Log[e*x + Sqrt
[e]*Sqrt[d + e*x^2]]))))/(3600*e^(3/2)*Sqrt[1 + (e*x^2)/d])
```

3.268.3 Rubi [A] (verified)

Time = 0.88 (sec) , antiderivative size = 371, normalized size of antiderivative = 0.80, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2786, 2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2786}$$

$$\frac{d\sqrt{d+ex^2}\int x^2\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(cx^n))\,dx}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{d\sqrt{d+ex^2}\left(-bn\int \frac{\sqrt{e}x\sqrt{\frac{ex^2}{d}+1}(8e^2x^4+14dex^2+3d^2)-3d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{48de^{3/2}x}dx-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(}{1}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$\downarrow$ 27

$$\frac{d\sqrt{d+ex^2}\left(-\frac{bn\int \frac{\sqrt{e}x\sqrt{\frac{ex^2}{d}+1}\left(8e^2x^4+14dex^2+3d^2\right)-3d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{48de^{3/2}}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\,l}{16e}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$\downarrow$ 2010

$$\frac{d\sqrt{d+ex^2}\left(-\frac{bn\int \left(8e^{5/2}\sqrt{\frac{ex^2}{d}+1}x^4+14de^{3/2}\sqrt{\frac{ex^2}{d}+1}x^2+3d^2\sqrt{e}\sqrt{\frac{ex^2}{d}+1}-\frac{3d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}\right)dx}{48de^{3/2}}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(}{16e^{3/2}}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$\downarrow$ 2009

$$d\sqrt{d+ex^2}\left(-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{16e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{16e}+\frac{1}{6}x^3\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(cx^n))+\frac{1}{8}x^3\sqrt{\frac{e}{}}\right.$$

input
```
Int[x^2*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(d*Sqrt[d + e*x^2]*((d*x*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(16*e) +
(x^3*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/8 + (x^3*(1 + (e*x^2)/d)^(3/2
)*(a + b*Log[c*x^n]))/6 - (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log
[c*x^n]))/(16*e^(3/2)) - (b*n*((11*d^2*Sqrt[e]*x*Sqrt[1 + (e*x^2)/d])/4 +
(23*d*e^(3/2)*x^3*Sqrt[1 + (e*x^2)/d])/6 + (4*e^(5/2)*x^5*Sqrt[1 + (e*x^2)
/d])/3 + (d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/4 + (3*d^(5/2)*ArcSinh[(Sq
rt[e]*x)/Sqrt[d]]^2)/2 - 3*d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^
(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])] - (3*d^(5/2)*PolyLog[2, E^(2*ArcSinh[(Sq
rt[e]*x)/Sqrt[d]])])/2))/(48*d*e^(3/2))))/Sqrt[1 + (e*x^2)/d]
```

3.268. $\int x^2(d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$

3.268.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.268.4 Maple [F]

$$\int x^{2} \left(e\,x^{2}+d\right)^{\frac{3}{2}} \left(a+b\ln \left(c\,x^{n}\right)\right)dx$$

input
```
int(x^2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int(x^2*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

3.268.5 Fricas [F]

$$\int x^2 \left(d+ex^2\right)^{3/2} (a+b\log (cx^n)) \, dx = \int (ex^2+d)^{\frac{3}{2}} (b\log (cx^n)+a)x^2 \, dx$$

input
```
integrate(x^2*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral((b*e*x^4 + b*d*x^2)*sqrt(e*x^2 + d)*log(c*x^n) + (a*e*x^4 + a*d*x
^2)*sqrt(e*x^2 + d), x)
```

3.268.6 Sympy [F(-1)]

Timed out.

$$\int x^2 \left(d+ex^2\right)^{3/2} (a+b\log (cx^n)) \, dx = \text{Timed out}$$

input
```
integrate(x**2*(e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

3.268.7 Maxima [F(-2)]

Exception generated.

$$\int x^2 \left(d+ex^2\right)^{3/2} (a+b\log (cx^n)) \, dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^2*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.268.8 Giac [F]

$$\int x^2\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\int \left(ex^2+d\right)^{\frac{3}{2}}\left(b\log\left(cx^n\right)+a\right)x^2\,dx$$

input
```
integrate(x^2*(e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)*x^2, x)
```

3.268.9 Mupad [F(-1)]

Timed out.

$$\int x^2\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^2\,\left(e\,x^2+d\right)^{3/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^2*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

output
```
int(x^2*(d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

3.269 $\int \left(d+ex^2\right)^{3/2} \left(a+b\log \left(cx^n\right)\right) \, dx$

3.269.1 Optimal result

Integrand size = 22, antiderivative size = 378

$$\int \left(d+ex^2\right)^{3/2} \left(a+b\log \left(cx^n\right)\right) \, dx = -\frac{9}{32}bdnx\sqrt{d+ex^2}-\frac{1}{16}bnx\left(d+ex^2\right)^{3/2}$$
$$+\frac{3bd^{5/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{16\sqrt{e}\sqrt{d+ex^2}}-\frac{9bd^2n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{32\sqrt{e}}$$
$$-\frac{3bd^{5/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{8\sqrt{e}\sqrt{d+ex^2}}$$
$$+\frac{3}{8}dx\sqrt{d+ex^2}(a+b\log\left(cx^n\right))+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)+\frac{3d^{5/2}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\left(a+b\log\left(cx\right.\right.}{8\sqrt{e}\sqrt{d+ex^2}}$$

output
```
-1/16*b*n*x*(e*x^2+d)^(3/2)+1/4*x*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))-9/32*b*d
^2*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/e^(1/2)-9/32*b*d*n*x*(e*x^2+d)^(1/
2)+3/8*d*x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)+3/16*b*d^(5/2)*n*arcsinh(x*e^(1
/2)/d^(1/2))^2*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)-3/8*b*d^(5/2)*n*a
rcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(1
+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)+3/8*d^(5/2)*arcsinh(x*e^(1/2)/d^(1
/2))*(a+b*ln(c*x^n))*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)-3/16*b*d^(5
/2)*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(1+e*x^2/d)^(1/2)
/e^(1/2)/(e*x^2+d)^(1/2)
```

3.269.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.55 (sec) , antiderivative size = 314, normalized size of antiderivative = 0.83

$$\int (d+ex^2)^{3/2}(a+b\log(cx^n))\,dx = \frac{-8be^{3/2}nx^3\sqrt{d+ex^2}\,{}_3F_2\left(-\frac{1}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)+9\left(-4bd\sqrt{e}nx\sqrt{d+ex^2}\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2}\right.\right.}{}$$

input
```
Integrate[(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output
```
(-8*b*e^(3/2)*n*x^3*Sqrt[d + e*x^2]*HypergeometricPFQ[{-1/2, 3/2, 3/2}, {5
/2, 5/2}, -((e*x^2)/d)] + 9*(-4*b*d*Sqrt[e]*n*x*Sqrt[d + e*x^2]*Hypergeome
tricPFQ[{1/2, 1/2, 1/2}, {3/2, 3/2}, -((e*x^2)/d)] + b*d^(3/2)*n*Sqrt[d +
e*x^2]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(-2 + 3*Log[x]) + Sqrt[1 + (e*x^2)/d]*
(Sqrt[e]*x*Sqrt[d + e*x^2]*(5*a*d - 2*b*d*n + 2*a*e*x^2) + 3*d^2*(a - b*n*
Log[x])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]] + b*Log[c*x^n]*(Sqrt[e]*x*Sqrt[
d + e*x^2]*(5*d + 2*e*x^2) + 3*d^2*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]]))))/
(72*Sqrt[e]*Sqrt[1 + (e*x^2)/d])
```

3.269.3 Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 1.12 (sec) , antiderivative size = 355, normalized size of antiderivative = 0.94, number of steps used = 20, number of rules used = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.864$, Rules used = {2758, 211, 211, 224, 219, 2758, 211, 224, 219, 2764, 2762, 6190, 3042, 26, 4199, 25, 2620, 2715, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^2)^{3/2}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2758}$$

$$\frac{3}{4}d\int \sqrt{ex^2+d}(a+b\log(cx^n))\,dx-\frac{1}{4}bn\int (ex^2+d)^{3/2}\,dx+\frac{1}{4}x(d+ex^2)^{3/2}(a+b\log(cx^n))$$

$$\Big\downarrow \ 211$$

$$\frac{3}{4}d\int \sqrt{ex^2+d}(a+b\log(cx^n))\,dx-\frac{1}{4}bn\left(\frac{3}{4}d\int \sqrt{ex^2+d}dx+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))$$

$$\Big\downarrow \ 211$$

$$\frac{3}{4}d\int \sqrt{ex^2+d}(a+b\log(cx^n))\,dx-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{1}{2}d\int \frac{1}{\sqrt{ex^2+d}}dx+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))$$

$$\Big\downarrow \ 224$$

$$\frac{3}{4}d\int \sqrt{ex^2+d}(a+b\log(cx^n))\,dx-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{1}{2}d\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))$$

$$\Big\downarrow \ 219$$

$$\frac{3}{4}d\int \sqrt{ex^2+d}(a+b\log(cx^n))\,dx+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \ 2758$$

$$\frac{3}{4}d\left(\frac{1}{2}d\int \frac{a+b\log(cx^n)}{\sqrt{ex^2+d}}dx-\frac{1}{2}bn\int \sqrt{ex^2+d}dx+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \ 211$$

3.269. $\int \left(d+ex^2\right)^{3/2}(a+b\log(cx^n))\,dx$

$$\frac{3}{4}d\left(\frac{1}{2}d\int\frac{a+b\log(cx^n)}{\sqrt{ex^2+d}}dx-\frac{1}{2}bn\left(\frac{1}{2}d\int\frac{1}{\sqrt{ex^2+d}}dx+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{224}$$

$$\frac{3}{4}d\left(\frac{1}{2}d\int\frac{a+b\log(cx^n)}{\sqrt{ex^2+d}}dx-\frac{1}{2}bn\left(\frac{1}{2}d\int\frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n)\right)\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{219}$$

$$\frac{3}{4}d\left(\frac{1}{2}d\int\frac{a+b\log(cx^n)}{\sqrt{ex^2+d}}dx+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{2764}$$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\int\frac{a+b\log(cx^n)}{\sqrt{\frac{ex^2}{d}+1}}dx}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{2762}$$

3.269. $\int\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))\,dx$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int\frac{\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{1}{2}bn\left(\right.\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-$$
$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{ 6190}$$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int\frac{\sqrt{d}\sqrt{\frac{ex^2}{d}+1}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}x}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{d+ex^2}(a+\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-$$
$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{ 3042}$$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int-i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\tan\left(i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)+\frac{\pi}{2}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-$$
$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{ 26}$$

3.269. $\int \left(d+ex^2\right)^{3/2}(a+b\log(cx^n))\,dx$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\int \text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\tan\left(i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)+\frac{\pi}{2}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{2\sqrt{d+ex^2}}+\frac{1}{2}x\sqrt{\ }\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-$$

$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{4199}$$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(2i\int -\frac{e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\text{arcsinh}\left(\frac{\sqrt{\ }}{\ }\right.\right.}{\sqrt{e}}\right.}{2\sqrt{d+ex^2}}\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-$$

$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$$\Big\downarrow \text{25}$$

3.269. $\int \left(d+ex^2\right)^{3/2}(a+b\log(cx^n))\,dx$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\int\frac{e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\text{arcsinh}\left(\right.}{\sqrt{e}}}{2\sqrt{d+ex^2}}\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-$$
$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$\Big\downarrow$ 2620

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(\frac{1}{2}\int\log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\right.\right.}{\sqrt{e}}}{2\sqrt{d+ex^2}}\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-$$
$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$\Big\downarrow$ 2715

3.269. $\int\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))\,dx$

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(\frac{1}{4}\int e^{-2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)de^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}-\right.\right.}{\sqrt{e}}\right.}{2\sqrt{d+ex^2}}\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-$$
$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

$\downarrow$ 2838

$$\frac{3}{4}d\left(\frac{d\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(-\frac{1}{4}\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)-\frac{1}{2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\text{arcs}}\right.\right.\right.}{\sqrt{e}}\right.}{2\sqrt{d+ex^2}}\right.$$

$$\frac{1}{4}x\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))-$$
$$\frac{1}{4}bn\left(\frac{3}{4}d\left(\frac{d\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{2\sqrt{e}}+\frac{1}{2}x\sqrt{d+ex^2}\right)+\frac{1}{4}x\left(d+ex^2\right)^{3/2}\right)$$

input

```
Int[(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]),x]
```

output

```
-1/4*(b*n*((x*(d + e*x^2)^(3/2))/4 + (3*d*((x*Sqrt[d + e*x^2])/2 + (d*ArcT
anh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(2*Sqrt[e])))/4)) + (x*(d + e*x^2)^(3/2)
*(a + b*Log[c*x^n]))/4 + (3*d*(-1/2*(b*n*((x*Sqrt[d + e*x^2])/2 + (d*ArcTa
nh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(2*Sqrt[e]))) + (x*Sqrt[d + e*x^2]*(a + b
*Log[c*x^n]))/2 + (d*Sqrt[1 + (e*x^2)/d]*((Sqrt[d]*ArcSinh[(Sqrt[e]*x)/Sqr
t[d]]*(a + b*Log[c*x^n]))/Sqrt[e] + (I*b*Sqrt[d]*n*((-1/2*I)*ArcSinh[(Sqrt
[e]*x)/Sqrt[d]]^2 - (2*I)*(-1/2*(ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2
*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])]) - PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqr
t[d]])]/4)))/Sqrt[e]))/(2*Sqrt[d + e*x^2])))/4
```

3.269. $\int \left(d+ex^2\right)^{3/2}(a+b\log(cx^n))\,dx$

3.269.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 26
```
Int[(Complex[0, a_])*(Fx_), x_Symbol] :> Simp[(Complex[Identity[0], a])   I
nt[Fx, x], x] /; FreeQ[a, x] && EqQ[a^2, 1]
```

rule 211
```
Int[((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[x*((a + b*x^2)^p/(2*p + 1
)), x] + Simp[2*a*(p/(2*p + 1))   Int[(a + b*x^2)^(p - 1), x], x] /; FreeQ[
{a, b}, x] && GtQ[p, 0] && (IntegerQ[4*p] || IntegerQ[6*p])
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 2620
```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[d*(m/(b*f*g*n*Log[F]))   Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x
)))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

rule 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[1/(d*e*n*Log[F])   Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x)
))^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

rule 2758
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_.), x_Sy
mbol] :> Simp[x*(d + e*x^2)^q*((a + b*Log[c*x^n])/(2*q + 1)), x] + (-Simp[b
*(n/(2*q + 1))   Int[(d + e*x^2)^q, x], x] + Simp[2*d*(q/(2*q + 1))   Int[(
d + e*x^2)^(q - 1)*(a + b*Log[c*x^n]), x], x]) /; FreeQ[{a, b, c, d, e, n},
 x] && GtQ[q, 0]
```

3.269. $\int (d+ex^2)^{3/2} (a+b\log (cx^n)) \, dx$

rule 2762
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]*((a + b*Log[c*x^n])/Rt[e, 2]), x]
 - Simp[b*(n/Rt[e, 2])   Int[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]/x, x], x] /; Fre
eQ[{a, b, c, d, e, n}, x] && GtQ[d, 0] && PosQ[e]
```

rule 2764
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[Sqrt[1 + (e/d)*x^2]/Sqrt[d + e*x^2]   Int[(a + b*Log[c*x^n])/Sq
rt[1 + (e/d)*x^2], x], x] /; FreeQ[{a, b, c, d, e, n}, x] &&  !GtQ[d, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4199
```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Simp
[2*I   Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x
))/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && In
tegerQ[4*k] && IGtQ[m, 0]
```

rule 6190
```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Simp[1/b
 Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[n, 0]
```

3.269.4 Maple [F]

$$\int \left(e\,x^{2}+d\right)^{\frac{3}{2}} \left(a +b \ln \left(c\,x^{n}\right)\right)dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n)),x)
```

3.269.5 Fricas [F]

$$\int \left(d+ex^2\right)^{3/2} \left(a+b\log\left(cx^n\right)\right)\,dx = \int \left(ex^2+d\right)^{\frac{3}{2}}\left(b\log\left(cx^n\right)+a\right)dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral((b*e*x^2 + b*d)*sqrt(e*x^2 + d)*log(c*x^n) + (a*e*x^2 + a*d)*sqrt
(e*x^2 + d), x)
```

3.269.6 Sympy [F(-1)]

Timed out.

$$\int \left(d+ex^2\right)^{3/2} \left(a+b\log\left(cx^n\right)\right)\,dx = \text{Timed out}$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

3.269.7 Maxima [F(-2)]

Exception generated.

$$\int \left(d+ex^2\right)^{3/2} \left(a+b\log\left(cx^n\right)\right)\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.269.8 Giac [F]

$$\int \left(d+ex^2\right)^{3/2}(a+b\log(cx^n))\,dx=\int \left(ex^2+d\right)^{\frac{3}{2}}(b\log(cx^n)+a)\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a), x)
```

3.269.9 Mupad [F(-1)]

Timed out.

$$\int \left(d+ex^2\right)^{3/2}(a+b\log(cx^n))\,dx=\int \left(e\,x^2+d\right)^{3/2}\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int((d + e*x^2)^(3/2)*(a + b*log(c*x^n)),x)
```

output
```
int((d + e*x^2)^(3/2)*(a + b*log(c*x^n)), x)
```

3.270 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx$

3.270.1 Optimal result

Integrand size = 25, antiderivative size = 400

$$\begin{aligned}\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx &= -\frac{bdn\sqrt{d+ex^2}}{x}-\frac{1}{4}benx\sqrt{d+ex^2}\\
&+\frac{3b\sqrt{d}\sqrt{e}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{4\sqrt{1+\frac{ex^2}{d}}}+\frac{3b\sqrt{d}\sqrt{e}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{4\sqrt{1+\frac{ex^2}{d}}}\\
&-\frac{3b\sqrt{d}\sqrt{e}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2\sqrt{1+\frac{ex^2}{d}}}\\
&+\frac{3}{2}ex\sqrt{d+ex^2}(a+b\log(cx^n))-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x}\\
&+\frac{3\sqrt{d}\sqrt{e}\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{1+\frac{ex^2}{d}}}\\
&-\frac{3b\sqrt{d}\sqrt{e}n\sqrt{d+ex^2}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{4\sqrt{1+\frac{ex^2}{d}}}\end{aligned}$$

output
```
-(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x-b*d*n*(e*x^2+d)^(1/2)/x-1/4*b*e*n*x*(e*
x^2+d)^(1/2)+3/2*e*x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)+3/4*b*n*arcsinh(x*e^(
1/2)/d^(1/2))*d^(1/2)*e^(1/2)*(e*x^2+d)^(1/2)/(1+e*x^2/d)^(1/2)+3/4*b*n*ar
csinh(x*e^(1/2)/d^(1/2))^2*d^(1/2)*e^(1/2)*(e*x^2+d)^(1/2)/(1+e*x^2/d)^(1/
2)-3/2*b*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^
(1/2))^2)*d^(1/2)*e^(1/2)*(e*x^2+d)^(1/2)/(1+e*x^2/d)^(1/2)+3/2*arcsinh(x*
e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*d^(1/2)*e^(1/2)*(e*x^2+d)^(1/2)/(1+e*x^2/
d)^(1/2)-3/4*b*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*d^(1/2
)*e^(1/2)*(e*x^2+d)^(1/2)/(1+e*x^2/d)^(1/2)
```

3.270.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.63 (sec) , antiderivative size = 329, normalized size of antiderivative = 0.82

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx =$$

$$-\frac{b\sqrt{d}n\sqrt{d+ex^2}\left(\sqrt{d}\,{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{ex^2}{d}\right)+\left(\sqrt{d}\sqrt{1+\frac{ex^2}{d}}-\sqrt{e}x\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\right)\log(x)\right)}{x\sqrt{1+\frac{ex^2}{d}}}$$

$$+\frac{b\sqrt{e}n\sqrt{d+ex^2}\left(-2\sqrt{e}x\,{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{ex^2}{d}\right)+\left(\sqrt{e}x\sqrt{1+\frac{ex^2}{d}}+\sqrt{d}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\right)(-1+2\log(x))\right)}{4\sqrt{1+\frac{ex^2}{d}}}$$

$$-\frac{(2d-ex^2)\sqrt{d+ex^2}(a-bn\log(x)+b\log(cx^n))}{2x}$$

$$+\frac{3}{2}d\sqrt{e}(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((b*Sqrt[d]*n*Sqrt[d + e*x^2]*(Sqrt[d]*HypergeometricPFQ[{-1/2, -1/2, -1/
2}, {1/2, 1/2}, -((e*x^2)/d)] + (Sqrt[d]*Sqrt[1 + (e*x^2)/d] - Sqrt[e]*x*A
rcSinh[(Sqrt[e]*x)/Sqrt[d]])*Log[x]))/(x*Sqrt[1 + (e*x^2)/d])) + (b*Sqrt[e
]*n*Sqrt[d + e*x^2]*(-2*Sqrt[e]*x*HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2,
 3/2}, -((e*x^2)/d)] + (Sqrt[e]*x*Sqrt[1 + (e*x^2)/d] + Sqrt[d]*ArcSinh[(S
qrt[e]*x)/Sqrt[d]])*(-1 + 2*Log[x])))/(4*Sqrt[1 + (e*x^2)/d]) - ((2*d - e*
x^2)*Sqrt[d + e*x^2]*(a - b*n*Log[x] + b*Log[c*x^n]))/(2*x) + (3*d*Sqrt[e]
*(a - b*n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/2
```

3.270.3 Rubi [A] (verified)

Time = 0.73 (sec) , antiderivative size = 313, normalized size of antiderivative = 0.78, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2786, 2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}dx$$

$$\Big\downarrow \text{2786}$$

$$\frac{d\sqrt{d+ex^2}\int \frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(cx^n))}{x^2}dx}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{d\sqrt{d+ex^2}\left(-bn\int -\frac{(2d-ex^2)\sqrt{\frac{ex^2}{d}+1}-3\sqrt{d}\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2dx^2}dx+\frac{3\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(c\right.}{x}}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{27}$$

$$\frac{d\sqrt{d+ex^2}\left(\frac{bn\int \frac{(2d-ex^2)\sqrt{\frac{ex^2}{d}+1}-3\sqrt{d}\sqrt{e}x\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x^2}dx}{2d}+\frac{3\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(cx^n))}{x}+\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2010}$$

$$\frac{d\sqrt{d+ex^2}\left(\frac{bn\int \left(\frac{2\sqrt{\frac{ex^2}{d}+1}d}{x^2}-\frac{3\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\sqrt{d}}{x}-e\sqrt{\frac{ex^2}{d}+1}\right)dx}{2d}+\frac{3\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(c\right.}{x}}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d\sqrt{d+ex^2}\left(\frac{3\sqrt{e}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2\sqrt{d}}-\frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(cx^n))}{x}+\frac{3ex\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{2d}+\frac{bn\left(-\frac{3}{2}\sqrt{d}\sqrt{e}\,\text{PolyLog}\left(\right.\right.}{}\right.}{}$$

input
```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
(d*Sqrt[d + e*x^2]*((3*e*x*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(2*d) -
 ((1 + (e*x^2)/d)^(3/2)*(a + b*Log[c*x^n]))/x + (3*Sqrt[e]*ArcSinh[(Sqrt[e
]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*Sqrt[d]) + (b*n*((-2*d*Sqrt[1 + (e*x^
2)/d])/x - (e*x*Sqrt[1 + (e*x^2)/d])/2 + (3*Sqrt[d]*Sqrt[e]*ArcSinh[(Sqrt[
e]*x)/Sqrt[d]])/2 + (3*Sqrt[d]*Sqrt[e]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/2 -
 3*Sqrt[d]*Sqrt[e]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt
[e]*x)/Sqrt[d]])] - (3*Sqrt[d]*Sqrt[e]*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)
/Sqrt[d]])])/2))/(2*d)))/Sqrt[1 + (e*x^2)/d]
```

3.270.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

3.270. $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx$

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.270.4 Maple [F]

$$\int \frac{\left(e\,x^{2}+d\right)^{\frac{3}{2}} \left(a+b\ln \left(c\,x^{n}\right)\right)}{x^{2}}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^2,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^2,x)
```

3.270.5 Fricas [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
integral(((b*e*x^2 + b*d)*sqrt(e*x^2 + d)*log(c*x^n) + (a*e*x^2 + a*d)*sqr
t(e*x^2 + d))/x^2, x)
```

3.270.6 Sympy [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(a+b\log(cx^n))(d+ex^2)^{\frac{3}{2}}}{x^2}\,dx$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**2,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**2, x)
```

3.270.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.270.8 Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^2}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x^2, x)
```

3.270.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(e\,x^2+d)^{3/2}\,(a+b\,\ln(c\,x^n))}{x^2}\,dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^2,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^2, x)
```

3.271 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx$

3.271.1 Optimal result

Integrand size = 25, antiderivative size = 400

$$\begin{aligned}\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx &= -\frac{4ben\sqrt{d+ex^2}}{3x}-\frac{bn(d+ex^2)^{3/2}}{9x^3}\\
&+\frac{4be^{3/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{3\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}+\frac{be^{3/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{2\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}\\
&-\frac{be^{3/2}n\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}\\
&-\frac{e\sqrt{d+ex^2}(a+b\log(cx^n))}{x}-\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3x^3}\\
&+\frac{e^{3/2}\sqrt{d+ex^2}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}\\
&-\frac{be^{3/2}n\sqrt{d+ex^2}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2\sqrt{d}\sqrt{1+\frac{ex^2}{d}}}\end{aligned}$$

output
```
-1/9*b*n*(e*x^2+d)^(3/2)/x^3-1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^3-4/3*b
*e*n*(e*x^2+d)^(1/2)/x-e*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/x+4/3*b*e^(3/2)*n
*arcsinh(x*e^(1/2)/d^(1/2))*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)+1/2*
b*e^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))^2*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/
d)^(1/2)-b*e^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1
+e*x^2/d)^(1/2))^2)*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)+e^(3/2)*arcs
inh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)
^(1/2)-1/2*b*e^(3/2)*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*
(e*x^2+d)^(1/2)/d^(1/2)/(1+e*x^2/d)^(1/2)
```

3.271.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.50 (sec) , antiderivative size = 269, normalized size of antiderivative = 0.67

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx = \frac{bdn\sqrt{d+ex^2}\left(-\text{Hypergeometric2F1}\left(-\frac{3}{2},-\frac{3}{2},-\frac{1}{2},-\frac{ex^2}{d}\right)-3\left(1+\frac{ex^2}{d}\right.\right.}{9x^3\sqrt{1+\frac{ex^2}{d}}}$$
$$+\frac{ben\sqrt{d+ex^2}\left(-{}_3F_2\left(-\frac{1}{2},-\frac{1}{2},-\frac{1}{2};\frac{1}{2},\frac{1}{2};-\frac{ex^2}{d}\right)-\sqrt{1+\frac{ex^2}{d}}\log(x)+\frac{\sqrt{e}x\,\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log(x)}{\sqrt{d}}\right)}{x\sqrt{1+\frac{ex^2}{d}}}$$
$$-\frac{\sqrt{d+ex^2}(d+4ex^2)(a-bn\log(x)+b\log(cx^n))}{3x^3}$$
$$+e^{3/2}(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*d*n*Sqrt[d + e*x^2]*(-Hypergeometric2F1[-3/2, -3/2, -1/2, -((e*x^2)/d)]
 - 3*(1 + (e*x^2)/d)^(3/2)*Log[x]))/(9*x^3*Sqrt[1 + (e*x^2)/d]) + (b*e*n*S
qrt[d + e*x^2]*(-HypergeometricPFQ[{-1/2, -1/2, -1/2}, {1/2, 1/2}, -((e*x^
2)/d)] - Sqrt[1 + (e*x^2)/d]*Log[x] + (Sqrt[e]*x*ArcSinh[(Sqrt[e]*x)/Sqrt[
d]]*Log[x])/Sqrt[d]))/(x*Sqrt[1 + (e*x^2)/d]) - (Sqrt[d + e*x^2]*(d + 4*e*
x^2)*(a - b*n*Log[x] + b*Log[c*x^n]))/(3*x^3) + e^(3/2)*(a - b*n*Log[x] +
b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]]
```

3.271.3 Rubi [A] (verified)

Time = 0.68 (sec) , antiderivative size = 312, normalized size of antiderivative = 0.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2786, 2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}dx$$

$$\Big\downarrow \text{ 2786}$$

$$\frac{d\sqrt{d+ex^2}\int \frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(cx^n))}{x^4}dx}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{ 2792}$$

$$\frac{d\sqrt{d+ex^2}\left(-bn\int\left(\frac{e^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{d^{3/2}x}-\frac{(4ex^2+d)\sqrt{\frac{ex^2}{d}+1}}{3dx^4}\right)dx+\frac{e^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}-\frac{e\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n}{dx}\right.}{\sqrt{\frac{ex^2}{d}+1}}$$

$$\Big\downarrow \text{ 2009}$$

$$d\sqrt{d+ex^2}\left(\frac{e^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{d^{3/2}}-\frac{e\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{dx}-\frac{\left(\frac{ex^2}{d}+1\right)^{3/2}(a+b\log(cx^n))}{3x^3}-bn\left(\frac{e^{3/2}\text{PolyLog}\left(2,e^{2\text{ar}}\right.}{2d^{3/2}}\right.\right.$$

input
```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(d*Sqrt[d + e*x^2]*(-((e*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(d*x)) -
((1 + (e*x^2)/d)^(3/2)*(a + b*Log[c*x^n]))/(3*x^3) + (e^(3/2)*ArcSinh[(Sqr
t[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/d^(3/2) - b*n*((4*e*Sqrt[1 + (e*x^2)/
d])/(3*d*x) + (1 + (e*x^2)/d)^(3/2)/(9*x^3) - (4*e^(3/2)*ArcSinh[(Sqrt[e]*
x)/Sqrt[d]])/(3*d^(3/2)) - (e^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(2*d^(
3/2)) + (e^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e
]*x)/Sqrt[d]])])/d^(3/2) + (e^(3/2)*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sq
rt[d]])])/(2*d^(3/2)))))/Sqrt[1 + (e*x^2)/d]
```

3.271.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.271.4 Maple [F]

$$\int \frac{(e\,x^2+d)^{\frac{3}{2}}\,(a+b\ln(c\,x^n))}{x^4}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^4,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^4,x)
```

3.271.5 Fricas [F]

$$\int \frac{(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{x^4}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^4}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
integral(((b*e*x^2 + b*d)*sqrt(e*x^2 + d)*log(c*x^n) + (a*e*x^2 + a*d)*sqr
t(e*x^2 + d))/x^4, x)
```

3.271.6 Sympy [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx = \int \frac{(a+b\log(cx^n))(d+ex^2)^{\frac{3}{2}}}{x^4}\,dx$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**4,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**4, x)
```

3.271.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.271.8 Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^4}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^4}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x^4, x)
```

3.271.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2} (a+b\log(cx^n))}{x^4} dx = \int \frac{(e\,x^2+d)^{3/2} (a+b\,\ln(c\,x^n))}{x^4} dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^4,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^4, x)
```

3.272 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx$

3.272.1 Optimal result

Integrand size = 25, antiderivative size = 138

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx = -\frac{be^2n\sqrt{d+ex^2}}{5dx}-\frac{ben(d+ex^2)^{3/2}}{15dx^3} -\frac{bn(d+ex^2)^{5/2}}{25dx^5}+\frac{be^{5/2}n\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{5d}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5dx^5}$$

output
```
-1/15*b*e*n*(e*x^2+d)^(3/2)/d/x^3-1/25*b*n*(e*x^2+d)^(5/2)/d/x^5+1/5*b*e^(
5/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d-1/5*(e*x^2+d)^(5/2)*(a+b*ln(c*
x^n))/d/x^5-1/5*b*e^2*n*(e*x^2+d)^(1/2)/d/x
```

3.272.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 114, normalized size of antiderivative = 0.83

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx = -\frac{\sqrt{d+ex^2}\left(15a(d+ex^2)^2+bn(3d^2+11dex^2+23e^2x^4)\right)+15b(d+ex^2)^{5/2}\log(cx^n)-15be^{5/2}nx^5\log(ex}{75dx^5}$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/75*(Sqrt[d + e*x^2]*(15*a*(d + e*x^2)^2 + b*n*(3*d^2 + 11*d*e*x^2 + 23*
e^2*x^4)) + 15*b*(d + e*x^2)^(5/2)*Log[c*x^n] - 15*b*e^(5/2)*n*x^5*Log[e*x
 + Sqrt[e]*Sqrt[d + e*x^2]])/(d*x^5)
```

3.272.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.91, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.240, Rules used = {2773, 247, 247, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{x^6}dx$$

$$\Big\downarrow \ 2773$$

$$\frac{bn\int \frac{\left(ex^2+d\right)^{5/2}}{x^6}dx}{5d}-\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \ 247$$

$$\frac{bn\left(e\int \frac{\left(ex^2+d\right)^{3/2}}{x^4}dx-\frac{\left(d+ex^2\right)^{5/2}}{5x^5}\right)}{5d}-\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \ 247$$

$$\frac{bn\left(e\left(e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{\left(d+ex^2\right)^{3/2}}{3x^3}\right)-\frac{\left(d+ex^2\right)^{5/2}}{5x^5}\right)}{5d}-\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \ 247$$

$$\frac{bn\left(e\left(e\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{\left(d+ex^2\right)^{3/2}}{3x^3}\right)-\frac{\left(d+ex^2\right)^{5/2}}{5x^5}\right)}{5d}-\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \ 224$$

$$\frac{bn\left(e\left(e\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{\left(d+ex^2\right)^{3/2}}{3x^3}\right)-\frac{\left(d+ex^2\right)^{5/2}}{5x^5}\right)}{5d}-\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \ 219$$

$$\frac{bn\left(e\left(e\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)}{5d}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5dx^5}$$

input
```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*(-1/5*(d + e*x^2)^(5/2)/x^5 + e*(-1/3*(d + e*x^2)^(3/2)/x^3 + e*(-(Sq
rt[d + e*x^2]/x) + Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]))))/(5*d)
- ((d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*d*x^5)
```

3.272.3.1 Defintions of rubi rules used

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

3.272.4 Maple [F]

$$\int \frac{\left(e\,x^{2}+d\right)^{\frac{3}{2}} \left(a+b\ln\left(c\,x^{n}\right)\right)}{x^{6}}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^6,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^6,x)
```

3.272.5 Fricas [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 314, normalized size of antiderivative = 2.28

$$\int \frac{(d+ex^2)^{3/2}\,(a+b\log{(cx^n)})}{x^6}\,dx = \left[\frac{15\,be^{\frac{5}{2}}nx^5\log\left(-2\,ex^2-2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)-2\left((23\,be^2n+15\,ae^2\right.}{}\right.$$
$$-\frac{15\,b\sqrt{-e}e^2nx^5\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^2+d}}\right)+((23\,be^2n+15\,ae^2)x^4+3\,bd^2n+15\,ad^2+(11\,bden+30\,ade)x^2+15\,(b}{75\,dx^5}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
[1/150*(15*b*e^(5/2)*n*x^5*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x - d)
 - 2*((23*b*e^2*n + 15*a*e^2)*x^4 + 3*b*d^2*n + 15*a*d^2 + (11*b*d*e*n + 3
0*a*d*e)*x^2 + 15*(b*e^2*x^4 + 2*b*d*e*x^2 + b*d^2)*log(c) + 15*(b*e^2*n*x
^4 + 2*b*d*e*n*x^2 + b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d*x^5), -1/75*(15*
b*sqrt(-e)*e^2*n*x^5*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + ((23*b*e^2*n + 1
5*a*e^2)*x^4 + 3*b*d^2*n + 15*a*d^2 + (11*b*d*e*n + 30*a*d*e)*x^2 + 15*(b*
e^2*x^4 + 2*b*d*e*x^2 + b*d^2)*log(c) + 15*(b*e^2*n*x^4 + 2*b*d*e*n*x^2 +
b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d*x^5)]
```

3.272.6 Sympy [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx = \int \frac{(a+b\log(cx^n))(d+ex^2)^{\frac{3}{2}}}{x^6}\,dx$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**6,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**6, x)
```

3.272.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.272.8 Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^6}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x^6, x)
```

3.272.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^6}\,dx = \int \frac{(e\,x^2+d)^{3/2}\,(a+b\,\ln(c\,x^n))}{x^6}\,dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^6,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^6, x)
```

3.273 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx$

3.273.1 Optimal result

Integrand size = 25, antiderivative size = 196

$$\begin{aligned}\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx &= \frac{2be^3n\sqrt{d+ex^2}}{35d^2x}+\frac{2be^2n(d+ex^2)^{3/2}}{105d^2x^3} \\ &+\frac{2ben(d+ex^2)^{5/2}}{175d^2x^5}-\frac{bn(d+ex^2)^{7/2}}{49d^2x^7}-\frac{2be^{7/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{35d^2} \\ &-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}\end{aligned}$$

output

```
2/105*b*e^2*n*(e*x^2+d)^(3/2)/d^2/x^3+2/175*b*e*n*(e*x^2+d)^(5/2)/d^2/x^5-
1/49*b*n*(e*x^2+d)^(7/2)/d^2/x^7-2/35*b*e^(7/2)*n*arctanh(x*e^(1/2)/(e*x^2
+d)^(1/2))/d^2-1/7*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/d/x^7+2/35*e*(e*x^2+d)^
(5/2)*(a+b*ln(c*x^n))/d^2/x^5+2/35*b*e^3*n*(e*x^2+d)^(1/2)/d^2/x
```

3.273.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 145, normalized size of antiderivative = 0.74

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx = -\frac{\sqrt{d+ex^2}\left(105a(5d-2ex^2)(d+ex^2)^2+bn(75d^3+183d^2ex^2+71de^2x^4-247e^3x^6)\right)+105b(5d-2ex^2)(\cdots}{3675d^2x^7}$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
-1/3675*(Sqrt[d + e*x^2]*(105*a*(5*d - 2*e*x^2)*(d + e*x^2)^2 + b*n*(75*d^
3 + 183*d^2*e*x^2 + 71*d*e^2*x^4 - 247*e^3*x^6)) + 105*b*(5*d - 2*e*x^2)*(
d + e*x^2)^(5/2)*Log[c*x^n] + 210*b*e^(7/2)*n*x^7*Log[e*x + Sqrt[e]*Sqrt[d
 + e*x^2]])/(d^2*x^7)
```

3.273.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 179, normalized size of antiderivative = 0.91, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {2792, 27, 358, 247, 247, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{(5d-2ex^2)(ex^2+d)^{5/2}}{35d^2x^8}dx+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{(5d-2ex^2)(ex^2+d)^{5/2}}{x^8}dx}{35d^2}+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \text{358}$$

$$\frac{bn\left(-2e\int \frac{(ex^2+d)^{5/2}}{x^6}dx-\frac{5(d+ex^2)^{7/2}}{7x^7}\right)}{35d^2}+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \text{247}$$

$$\frac{bn\left(-2e\left(e\int\frac{(ex^2+d)^{3/2}}{x^4}dx-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{5(d+ex^2)^{7/2}}{7x^7}\right)}{35d^2}+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \; 247$$

$$\frac{bn\left(-2e\left(e\left(e\int\frac{\sqrt{ex^2+d}}{x^2}dx-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{5(d+ex^2)^{7/2}}{7x^7}\right)}{35d^2}+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \; 247$$

$$\frac{bn\left(-2e\left(e\left(e\left(e\int\frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{5(d+ex^2)^{7/2}}{7x^7}\right)}{35d^2}+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \; 224$$

$$\frac{bn\left(-2e\left(e\left(e\left(e\int\frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{5(d+ex^2)^{7/2}}{7x^7}\right)}{35d^2}+\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}$$

$$\Big\downarrow \; 219$$

$$\frac{2e(d+ex^2)^{5/2}(a+b\log(cx^n))}{35d^2x^5}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{7dx^7}+\frac{bn\left(-2e\left(e\left(e\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{5(d+ex^2)^{7/2}}{7x^7}\right)}{35d^2}$$

input

```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^8,x]
```

output

```
(b*n*((-5*(d + e*x^2)^(7/2))/(7*x^7) - 2*e*(-1/5*(d + e*x^2)^(5/2)/x^5 + e
*(-1/3*(d + e*x^2)^(3/2)/x^3 + e*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*ArcTanh[(
Sqrt[e]*x)/Sqrt[d + e*x^2]])))))/(35*d^2) - ((d + e*x^2)^(5/2)*(a + b*Log[
c*x^n]))/(7*d*x^7) + (2*e*(d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(35*d^2*x^
5)
```

3.273. $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx$

3.273.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.273. $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx$

3.273.4 Maple [F]

$$\int \frac{(e\,x^2+d)^{\frac{3}{2}}\,(a+b\ln(c\,x^n))}{x^8}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^8,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^8,x)
```

3.273.5 Fricas [A] (verification not implemented)

Time = 0.39 (sec) , antiderivative size = 423, normalized size of antiderivative = 2.16

$$\int \frac{(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{x^8}\,dx = \left[\frac{105\,be^{\frac{7}{2}}nx^7\log\left(-2\,ex^2+2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)+((247\,be^3n+210\,a\right.$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

output
```
[1/3675*(105*b*e^(7/2)*n*x^7*log(-2*e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(e)*x -
d) + ((247*b*e^3*n + 210*a*e^3)*x^6 - 75*b*d^3*n - (71*b*d*e^2*n + 105*a*d
*e^2)*x^4 - 525*a*d^3 - 3*(61*b*d^2*e*n + 280*a*d^2*e)*x^2 + 105*(2*b*e^3*
x^6 - b*d*e^2*x^4 - 8*b*d^2*e*x^2 - 5*b*d^3)*log(c) + 105*(2*b*e^3*n*x^6 -
 b*d*e^2*n*x^4 - 8*b*d^2*e*n*x^2 - 5*b*d^3*n)*log(x))*sqrt(e*x^2 + d))/(d^
2*x^7), 1/3675*(210*b*sqrt(-e)*e^3*n*x^7*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)
) + ((247*b*e^3*n + 210*a*e^3)*x^6 - 75*b*d^3*n - (71*b*d*e^2*n + 105*a*d*
e^2)*x^4 - 525*a*d^3 - 3*(61*b*d^2*e*n + 280*a*d^2*e)*x^2 + 105*(2*b*e^3*x
^6 - b*d*e^2*x^4 - 8*b*d^2*e*x^2 - 5*b*d^3)*log(c) + 105*(2*b*e^3*n*x^6 -
b*d*e^2*n*x^4 - 8*b*d^2*e*n*x^2 - 5*b*d^3*n)*log(x))*sqrt(e*x^2 + d))/(d^2
*x^7)]
```

3.273.6 Sympy [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx = \int \frac{(a+b\log(cx^n))(d+ex^2)^{\frac{3}{2}}}{x^8}\,dx$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**8,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**2)**(3/2)/x**8, x)
```

3.273.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.273.8 Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^8}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^8}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x^8, x)
```

3.273.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2} (a+b\log(cx^n))}{x^8}\,dx = \int \frac{(e\,x^2+d)^{3/2} \left(a+b\,\ln\left(c\,x^n\right)\right)}{x^8}\,dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^8,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^8, x)
```

3.274 $\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx$

3.274.1 Optimal result

Integrand size = 25, antiderivative size = 256

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx = -\frac{8be^4n\sqrt{d+ex^2}}{315d^3x} - \frac{8be^3n(d+ex^2)^{3/2}}{945d^3x^3} - \frac{8be^2n(d+ex^2)^{5/2}}{1575d^3x^5} - \frac{bn(d+ex^2)^{7/2}}{81d^2x^9} + \frac{50ben(d+ex^2)^{7/2}}{3969d^3x^7} + \frac{8be^{9/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{315d^3} - \frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9} + \frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7} - \frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}$$

output
```
-8/945*b*e^3*n*(e*x^2+d)^(3/2)/d^3/x^3-8/1575*b*e^2*n*(e*x^2+d)^(5/2)/d^3/
x^5-1/81*b*n*(e*x^2+d)^(7/2)/d^2/x^9+50/3969*b*e*n*(e*x^2+d)^(7/2)/d^3/x^7
+8/315*b*e^(9/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d^3-1/9*(e*x^2+d)^(5
/2)*(a+b*ln(c*x^n))/d/x^9+4/63*e*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/d^2/x^7-8
/315*e^2*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/d^3/x^5-8/315*b*e^4*n*(e*x^2+d)^(
1/2)/d^3/x
```

3.274.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 178, normalized size of antiderivative = 0.70

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx =$$
$$-\frac{\sqrt{d+ex^2}\Big(315a(d+ex^2)^2(35d^2-20dex^2+8e^2x^4)+bn(1225d^4+2425d^3ex^2+429d^2e^2x^4-677de^3x^6+}{9922}$$

input
```
Integrate[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^10,x]
```

output
```
-1/99225*(Sqrt[d + e*x^2]*(315*a*(d + e*x^2)^2*(35*d^2 - 20*d*e*x^2 + 8*e^
2*x^4) + b*n*(1225*d^4 + 2425*d^3*e*x^2 + 429*d^2*e^2*x^4 - 677*d*e^3*x^6
+ 2614*e^4*x^8)) + 315*b*(d + e*x^2)^(5/2)*(35*d^2 - 20*d*e*x^2 + 8*e^2*x^
4)*Log[c*x^n] - 2520*b*e^(9/2)*n*x^9*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(
d^3*x^9)
```

3.274.3 Rubi [A] (verified)

Time = 0.48 (sec) , antiderivative size = 238, normalized size of antiderivative = 0.93, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.400$, Rules used = {2792, 27, 1588, 27, 358, 247, 247, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx$$

$$\Big\downarrow \ 2792$$

$$-bn\int -\frac{(ex^2+d)^{5/2}(8e^2x^4-20dex^2+35d^2)}{315d^3x^{10}}dx-\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}$$

$$\Big\downarrow \ 27$$

$$\frac{bn\int \frac{(ex^2+d)^{5/2}(8e^2x^4-20dex^2+35d^2)}{x^{10}}dx}{315d^3}-\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}$$

$$\Big\downarrow \ 1588$$

$$\frac{bn\left(-\frac{\int \frac{2de\left(125d-36ex^2\right)\left(ex^2+d\right)^{5/2}}{x^8}dx}{9d}-\frac{35d\left(d+ex^2\right)^{7/2}}{9x^9}\right)}{315d^3}-\frac{8e^2\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{315d^3x^5}+\frac{4e\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{63d^2x^7}-\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{9dx^9}$$

$$\Big\downarrow \ 27$$

$$\frac{bn\left(-\frac{2}{9}e\int \frac{\left(125d-36ex^2\right)\left(ex^2+d\right)^{5/2}}{x^8}dx-\frac{35d\left(d+ex^2\right)^{7/2}}{9x^9}\right)}{315d^3}-\frac{8e^2\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{315d^3x^5}+\frac{4e\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{63d^2x^7}-\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{9dx^9}$$

$$\Big\downarrow \ 358$$

$$\frac{bn\left(-\frac{2}{9}e\left(-36e\int \frac{\left(ex^2+d\right)^{5/2}}{x^6}dx-\frac{125\left(d+ex^2\right)^{7/2}}{7x^7}\right)-\frac{35d\left(d+ex^2\right)^{7/2}}{9x^9}\right)}{315d^3}-\frac{8e^2\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{315d^3x^5}+\frac{4e\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{63d^2x^7}-\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{9dx^9}$$

$$\Big\downarrow \ 247$$

$$\frac{bn\left(-\frac{2}{9}e\left(-36e\left(e\int \frac{\left(ex^2+d\right)^{3/2}}{x^4}dx-\frac{\left(d+ex^2\right)^{5/2}}{5x^5}\right)-\frac{125\left(d+ex^2\right)^{7/2}}{7x^7}\right)-\frac{35d\left(d+ex^2\right)^{7/2}}{9x^9}\right)}{315d^3}-\frac{8e^2\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{315d^3x^5}+\frac{4e\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{63d^2x^7}-\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{9dx^9}$$

$$\Big\downarrow \ 247$$

$$\frac{bn\left(-\frac{2}{9}e\left(-36e\left(e\left(e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{\left(d+ex^2\right)^{3/2}}{3x^3}\right)-\frac{\left(d+ex^2\right)^{5/2}}{5x^5}\right)-\frac{125\left(d+ex^2\right)^{7/2}}{7x^7}\right)-\frac{35d\left(d+ex^2\right)^{7/2}}{9x^9}\right)}{315d^3}-\frac{8e^2\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{315d^3x^5}+\frac{4e\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{63d^2x^7}-\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{9dx^9}$$

$$\Big\downarrow \ 247$$

$$\frac{bn\left(-\frac{2}{9}e\left(-36e\left(e\left(e\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{\left(d+ex^2\right)^{3/2}}{3x^3}\right)-\frac{\left(d+ex^2\right)^{5/2}}{5x^5}\right)-\frac{125\left(d+ex^2\right)^{7/2}}{7x^7}\right)-\frac{35d\left(d+ex^2\right)^{7/2}}{9x^9}\right)}{315d^3}-\frac{8e^2\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{315d^3x^5}+\frac{4e\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{63d^2x^7}-\frac{\left(d+ex^2\right)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{9dx^9}$$

$$\Big\downarrow \ 224$$

3.274. $\int \frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{x^{10}}\,dx$

$$\frac{bn\left(-\frac{2}{9}e\left(-36e\left(e\left(e\left(e\int\frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{125(d+ex^2)^{7/2}}{7x^7}\right)-\frac{35d(d+ex^2)^{7/2}}{9x^9}\right)}{315d^3}$$

$$\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}$$

$$\Big\downarrow 219$$

$$-\frac{8e^2(d+ex^2)^{5/2}(a+b\log(cx^n))}{315d^3x^5}+\frac{4e(d+ex^2)^{5/2}(a+b\log(cx^n))}{63d^2x^7}-\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{9dx^9}+$$

$$\frac{bn\left(-\frac{2}{9}e\left(-36e\left(e\left(e\left(\sqrt{e}\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)-\frac{(d+ex^2)^{5/2}}{5x^5}\right)-\frac{125(d+ex^2)^{7/2}}{7x^7}\right)-\frac{35d(d+ex^2)^{7/2}}{9x^9}\right)}{315d^3}$$

input
```
Int[((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/x^10,x]
```

output
```
(b*n*((-35*d*(d + e*x^2)^(7/2))/(9*x^9) - (2*e*((-125*(d + e*x^2)^(7/2))/(
7*x^7) - 36*e*(-1/5*(d + e*x^2)^(5/2)/x^5 + e*(-1/3*(d + e*x^2)^(3/2)/x^3
+ e*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]))
)))/9))/(315*d^3) - ((d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(9*d*x^9) + (4*
e*(d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(63*d^2*x^7) - (8*e^2*(d + e*x^2)^
(5/2)*(a + b*Log[c*x^n]))/(315*d^3*x^5)
```

3.274.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

3.274. $\int\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx$

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.274.4 Maple [F]

$$\int \frac{(e\,x^2+d)^{\frac{3}{2}}\,(a+b\ln(c\,x^n))}{x^{10}}dx$$

input
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^10,x)
```

output
```
int((e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/x^10,x)
```

3.274.5 Fricas [A] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 526, normalized size of antiderivative = 2.05

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx = \left[\frac{1260\,be^{\frac{9}{2}}nx^9\log\left(-2\,ex^2-2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)-(2\,(1307\,be^4n+1\right.$$

$$-\frac{2520\,b\sqrt{-e}e^4nx^9\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^2+d}}\right)+(2\,(1307\,be^4n+1260\,ae^4)x^8-(677\,bde^3n+1260\,ade^3)x^6+1225\,bd^4n}{}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^10,x, algorithm="fricas")
```

output
```
[1/99225*(1260*b*e^(9/2)*n*x^9*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x
- d) - (2*(1307*b*e^4*n + 1260*a*e^4)*x^8 - (677*b*d*e^3*n + 1260*a*d*e^3)
*x^6 + 1225*b*d^4*n + 11025*a*d^4 + 3*(143*b*d^2*e^2*n + 315*a*d^2*e^2)*x^
4 + 25*(97*b*d^3*e*n + 630*a*d^3*e)*x^2 + 315*(8*b*e^4*x^8 - 4*b*d*e^3*x^6
 + 3*b*d^2*e^2*x^4 + 50*b*d^3*e*x^2 + 35*b*d^4)*log(c) + 315*(8*b*e^4*n*x^
8 - 4*b*d*e^3*n*x^6 + 3*b*d^2*e^2*n*x^4 + 50*b*d^3*e*n*x^2 + 35*b*d^4*n)*l
og(x))*sqrt(e*x^2 + d))/(d^3*x^9), -1/99225*(2520*b*sqrt(-e)*e^4*n*x^9*arc
tan(sqrt(-e)*x/sqrt(e*x^2 + d)) + (2*(1307*b*e^4*n + 1260*a*e^4)*x^8 - (67
7*b*d*e^3*n + 1260*a*d*e^3)*x^6 + 1225*b*d^4*n + 11025*a*d^4 + 3*(143*b*d^
2*e^2*n + 315*a*d^2*e^2)*x^4 + 25*(97*b*d^3*e*n + 630*a*d^3*e)*x^2 + 315*(
8*b*e^4*x^8 - 4*b*d*e^3*x^6 + 3*b*d^2*e^2*x^4 + 50*b*d^3*e*x^2 + 35*b*d^4)
*log(c) + 315*(8*b*e^4*n*x^8 - 4*b*d*e^3*n*x^6 + 3*b*d^2*e^2*n*x^4 + 50*b*
d^3*e*n*x^2 + 35*b*d^4*n)*log(x))*sqrt(e*x^2 + d))/(d^3*x^9)]
```

3.274.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx = \text{Timed out}$$

input
```
integrate((e*x**2+d)**(3/2)*(a+b*ln(c*x**n))/x**10,x)
```

output
```
Timed out
```

3.274.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^10,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.274.8 Giac [F]

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx = \int \frac{(ex^2+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x^{10}}\,dx$$

input
```
integrate((e*x^2+d)^(3/2)*(a+b*log(c*x^n))/x^10,x, algorithm="giac")
```

output
```
integrate((e*x^2 + d)^(3/2)*(b*log(c*x^n) + a)/x^10, x)
```

3.274.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{x^{10}}\,dx = \int \frac{(e\,x^2+d)^{3/2}\,(a+b\,\ln(c\,x^n))}{x^{10}}\,dx$$

input
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^10,x)
```

output
```
int(((d + e*x^2)^(3/2)*(a + b*log(c*x^n)))/x^10, x)
```

3.275 $\int x\sqrt{4+x^2}\log(x)\,dx$

3.275.1 Optimal result

Integrand size = 13, antiderivative size = 60

$$\int x\sqrt{4+x^2}\log(x)\,dx=-\frac{4}{3}\sqrt{4+x^2}-\frac{1}{9}\left(4+x^2\right)^{3/2}+\frac{8}{3}\text{arctanh}\left(\frac{\sqrt{4+x^2}}{2}\right)+\frac{1}{3}\left(4+x^2\right)^{3/2}\log(x)$$

output
```
-1/9*(x^2+4)^(3/2)+8/3*arctanh(1/2*(x^2+4)^(1/2))+1/3*(x^2+4)^(3/2)*ln(x)-
4/3*(x^2+4)^(1/2)
```

3.275.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.88

$$\int x\sqrt{4+x^2}\log(x)\,dx=\frac{1}{3}\left(-\frac{1}{3}\sqrt{4+x^2}\left(16+x^2\right)-8\log(x)+\left(4+x^2\right)^{3/2}\log(x)+8\log\left(2+\sqrt{4+x^2}\right)\right)$$

input
```
Integrate[x*Sqrt[4 + x^2]*Log[x],x]
```

output
```
(-1/3*(Sqrt[4 + x^2]*(16 + x^2)) - 8*Log[x] + (4 + x^2)^(3/2)*Log[x] + 8*L
og[2 + Sqrt[4 + x^2]])/3
```

3.275.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.07, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.462, Rules used = {2776, 243, 60, 60, 73, 220}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x\sqrt{x^2+4}\log(x)\,dx$$

$$\Big\downarrow \text{2776}$$

$$\frac{1}{3}\left(x^2+4\right)^{3/2}\log(x)-\frac{1}{3}\int\frac{\left(x^2+4\right)^{3/2}}{x}dx$$

$$\Big\downarrow \text{243}$$

$$\frac{1}{3}\left(x^2+4\right)^{3/2}\log(x)-\frac{1}{6}\int\frac{\left(x^2+4\right)^{3/2}}{x^2}dx^2$$

$$\Big\downarrow \text{60}$$

$$\frac{1}{6}\left(-4\int\frac{\sqrt{x^2+4}}{x^2}dx^2-\frac{2}{3}\left(x^2+4\right)^{3/2}\right)+\frac{1}{3}\left(x^2+4\right)^{3/2}\log(x)$$

$$\Big\downarrow \text{60}$$

$$\frac{1}{6}\left(-4\left(4\int\frac{1}{x^2\sqrt{x^2+4}}dx^2+2\sqrt{x^2+4}\right)-\frac{2}{3}\left(x^2+4\right)^{3/2}\right)+\frac{1}{3}\left(x^2+4\right)^{3/2}\log(x)$$

$$\Big\downarrow \text{73}$$

$$\frac{1}{6}\left(-4\left(8\int\frac{1}{x^4-4}d\sqrt{x^2+4}+2\sqrt{x^2+4}\right)-\frac{2}{3}\left(x^2+4\right)^{3/2}\right)+\frac{1}{3}\left(x^2+4\right)^{3/2}\log(x)$$

$$\Big\downarrow \text{220}$$

$$\frac{1}{6}\left(-4\left(2\sqrt{x^2+4}-4\text{arctanh}\left(\frac{\sqrt{x^2+4}}{2}\right)\right)-\frac{2}{3}\left(x^2+4\right)^{3/2}\right)+\frac{1}{3}\left(x^2+4\right)^{3/2}\log(x)$$

input
```
Int[x*Sqrt[4 + x^2]*Log[x],x]
```

output
```
((-2*(4 + x^2)^(3/2))/3 - 4*(2*Sqrt[4 + x^2] - 4*ArcTanh[Sqrt[4 + x^2]/2])
)/6 + ((4 + x^2)^(3/2)*Log[x])/3
```

3.275.3.1 Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 220
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(-(Rt[-a, 2]*Rt[b, 2])^(-
1))*ArcTanh[Rt[b, 2]*(x/Rt[-a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] &&
 (LtQ[a, 0] || GtQ[b, 0])
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

3.275.4 Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.25

method	result	size
meijerg	$\left(-\frac{2\sqrt{1+\frac{x^2}{4}}}{9}+\frac{2\ln(x)\sqrt{1+\frac{x^2}{4}}}{3}\right)x^2+\frac{32}{9}-\frac{32\sqrt{1+\frac{x^2}{4}}}{9}+\ln(x)\left(-\frac{8}{3}+\frac{8\sqrt{1+\frac{x^2}{4}}}{3}\right)+\frac{8\ln\left(\frac{1}{2}+\frac{\sqrt{1+\frac{x^2}{4}}}{2}\right)}{3}$	75

input
```
int(x*ln(x)*(x^2+4)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
(-2/9*(1+1/4*x^2)^(1/2)+2/3*ln(x)*(1+1/4*x^2)^(1/2))*x^2+32/9-32/9*(1+1/4*
x^2)^(1/2)+ln(x)*(-8/3+8/3*(1+1/4*x^2)^(1/2))+8/3*ln(1/2+1/2*(1+1/4*x^2)^(
1/2))
```

3.275.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 54, normalized size of antiderivative = 0.90

$$\int x\sqrt{4+x^2}\log(x)\,dx=-\frac{1}{9}\left(x^2-3\left(x^2+4\right)\log\left(x\right)+16\right)\sqrt{x^2+4}+\frac{8}{3}\log\left(-x+\sqrt{x^2+4}+2\right)-\frac{8}{3}\log\left(-x+\sqrt{x^2+4}-2\right)$$

input
```
integrate(x*log(x)*(x^2+4)^(1/2),x, algorithm="fricas")
```

output
```
-1/9*(x^2 - 3*(x^2 + 4)*log(x) + 16)*sqrt(x^2 + 4) + 8/3*log(-x + sqrt(x^2
 + 4) + 2) - 8/3*log(-x + sqrt(x^2 + 4) - 2)
```

3.275.6 Sympy [A] (verification not implemented)

Time = 7.76 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.18

$$\int x\sqrt{4+x^2}\log(x)\,dx=\left(\frac{x^2}{3}+\frac{4}{3}\right)\sqrt{x^2+4}\log\left(x\right)-\frac{\left(x^2+4\right)^{\frac{3}{2}}}{9}-\frac{4\sqrt{x^2+4}}{3}-\frac{4\log\left(\sqrt{x^2+4}-2\right)}{3}+\frac{4\log\left(\sqrt{x^2+4}+2\right)}{3}$$

input
```
integrate(x*ln(x)*(x**2+4)**(1/2),x)
```

output
```
(x**2/3 + 4/3)*sqrt(x**2 + 4)*log(x) - (x**2 + 4)**(3/2)/9 - 4*sqrt(x**2 +
 4)/3 - 4*log(sqrt(x**2 + 4) - 2)/3 + 4*log(sqrt(x**2 + 4) + 2)/3
```

3.275.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 39, normalized size of antiderivative = 0.65

$$\int x\sqrt{4+x^2}\log(x)\,dx = \frac{1}{3}\left(x^2+4\right)^{\frac{3}{2}}\log\left(x\right) - \frac{1}{9}\left(x^2+4\right)^{\frac{3}{2}} - \frac{4}{3}\sqrt{x^2+4} + \frac{8}{3}\,\mathrm{arsinh}\left(\frac{2}{|x|}\right)$$

input
```
integrate(x*log(x)*(x^2+4)^(1/2),x, algorithm="maxima")
```

output
```
1/3*(x^2 + 4)^(3/2)*log(x) - 1/9*(x^2 + 4)^(3/2) - 4/3*sqrt(x^2 + 4) + 8/3
*arcsinh(2/abs(x))
```

3.275.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 54, normalized size of antiderivative = 0.90

$$\int x\sqrt{4+x^2}\log(x)\,dx = \frac{1}{3}\left(x^2+4\right)^{\frac{3}{2}}\log\left(x\right) - \frac{1}{9}\left(x^2+4\right)^{\frac{3}{2}} - \frac{4}{3}\sqrt{x^2+4} + \frac{4}{3}\log\left(\sqrt{x^2+4}+2\right) - \frac{4}{3}\log\left(\sqrt{x^2+4}-2\right)$$

input
```
integrate(x*log(x)*(x^2+4)^(1/2),x, algorithm="giac")
```

output
```
1/3*(x^2 + 4)^(3/2)*log(x) - 1/9*(x^2 + 4)^(3/2) - 4/3*sqrt(x^2 + 4) + 4/3
*log(sqrt(x^2 + 4) + 2) - 4/3*log(sqrt(x^2 + 4) - 2)
```

3.275.9 Mupad [F(-1)]

Timed out.

$$\int x\sqrt{4+x^2}\log(x)\,dx = \int x\,\ln(x)\,\sqrt{x^2+4}\,dx$$

input
```
int(x*log(x)*(x^2 + 4)^(1/2),x)
```

output
```
int(x*log(x)*(x^2 + 4)^(1/2), x)
```

3.276 $\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}} dx$

3.276.1 Optimal result

Integrand size = 25, antiderivative size = 182

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}} dx = -\frac{8bd^2n\sqrt{d+ex^2}}{15e^3} + \frac{7bdn(d+ex^2)^{3/2}}{45e^3} - \frac{bn(d+ex^2)^{5/2}}{25e^3} + \frac{8bd^{5/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{15e^3} + \frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3} - \frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3} + \frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}$$

output
```
7/45*b*d*n*(e*x^2+d)^(3/2)/e^3-1/25*b*n*(e*x^2+d)^(5/2)/e^3+8/15*b*d^(5/2)
*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^3-2/3*d*(e*x^2+d)^(3/2)*(a+b*ln(c*x^
n))/e^3+1/5*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e^3-8/15*b*d^2*n*(e*x^2+d)^(1/
2)/e^3+d^2*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e^3
```

3.276.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 204, normalized size of antiderivative = 1.12

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}} dx = \frac{120ad^2\sqrt{d+ex^2} - 94bd^2n\sqrt{d+ex^2} - 60adex^2\sqrt{d+ex^2} + 17bdenx^2\sqrt{d+ex^2} + 45ae^2x^4\sqrt{d+ex^2} - 9be}{}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
(120*a*d^2*Sqrt[d + e*x^2] - 94*b*d^2*n*Sqrt[d + e*x^2] - 60*a*d*e*x^2*Sqr
t[d + e*x^2] + 17*b*d*e*n*x^2*Sqrt[d + e*x^2] + 45*a*e^2*x^4*Sqrt[d + e*x^
2] - 9*b*e^2*n*x^4*Sqrt[d + e*x^2] - 120*b*d^(5/2)*n*Log[x] + 15*b*Sqrt[d
+ e*x^2]*(8*d^2 - 4*d*e*x^2 + 3*e^2*x^4)*Log[c*x^n] + 120*b*d^(5/2)*n*Log[
d + Sqrt[d]*Sqrt[d + e*x^2]])/(225*e^3)
```

3.276.3 Rubi [A] (warning: unable to verify)

Time = 0.51 (sec) , antiderivative size = 164, normalized size of antiderivative = 0.90, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.280$, Rules used = {2792, 27, 1578, 1192, 25, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}dx$$

$$\Big\downarrow \ 2792$$

$$-bn\int \frac{\sqrt{ex^2+d}(3e^2x^4-4dex^2+8d^2)}{15e^3x}dx+\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \ 27$$

$$-\frac{bn\int \frac{\sqrt{ex^2+d}(3e^2x^4-4dex^2+8d^2)}{x}dx}{15e^3}+\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \ 1578$$

$$-\frac{bn\int \frac{\sqrt{ex^2+d}(3e^2x^4-4dex^2+8d^2)}{x^2}dx^2}{30e^3}+\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \ 1192$$

$$-\frac{bn\int -\frac{x^4\left(3e^2x^8-10de^2x^4+15d^2e^2\right)}{d-x^4}d\sqrt{ex^2+d}}{15e^5}+\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{25}$$

$$\frac{bn\int \frac{x^4\left(3e^2x^8-10de^2x^4+15d^2e^2\right)}{d-x^4}d\sqrt{ex^2+d}}{15e^5}+\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1584}$$

$$\frac{bn\int \left(-3e^2x^8+7de^2x^4-8d^2e^2+\frac{8d^3e^2}{d-x^4}\right)d\sqrt{ex^2+d}}{15e^5}+\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{\left(d+ex^2\right)^{5/2}(a+b\log(cx^n))}{5e^3}-\frac{2d\left(d+ex^2\right)^{3/2}(a+b\log(cx^n))}{3e^3}-\frac{bn\left(-8d^{5/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+8d^2e^2\sqrt{d+ex^2}-\frac{7}{3}de^2x^6+\frac{3e^2x^{10}}{5}\right)}{15e^5}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
-1/15*(b*n*((-7*d*e^2*x^6)/3 + (3*e^2*x^10)/5 + 8*d^2*e^2*Sqrt[d + e*x^2]
- 8*d^(5/2)*e^2*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]))/e^5 + (d^2*Sqrt[d + e*x
^2]*(a + b*Log[c*x^n]))/e^3 - (2*d*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(
3*e^3) + ((d + e*x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e^3)
```

3.276.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1578
```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a
+ b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Int
egerQ[(m - 1)/2]
```

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.276.4 Maple [F]

$$\int \frac{x^5(a+b\ln(c\,x^n))}{\sqrt{e\,x^2+d}}dx$$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

3.276.5 Fricas [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 314, normalized size of antiderivative = 1.73

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \left[\frac{60\,bd^{\frac{5}{2}}n\log\left(-\frac{ex^2+2\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(9\,(be^2n-5\,ae^2)x^4+94\,bd^2n-120\,ad^2-(17\,bden-60\,ade)x^2-1}{225\,e^3}\right.$$
$$-\frac{120\,b\sqrt{-d}d^2n\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex^2+d}}\right)+(9\,(be^2n-5\,ae^2)x^4+94\,bd^2n-120\,ad^2-(17\,bden-60\,ade)x^2-15}{225\,e^3}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/225*(60*b*d^(5/2)*n*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2)
 - (9*(b*e^2*n - 5*a*e^2)*x^4 + 94*b*d^2*n - 120*a*d^2 - (17*b*d*e*n - 60*
a*d*e)*x^2 - 15*(3*b*e^2*x^4 - 4*b*d*e*x^2 + 8*b*d^2)*log(c) - 15*(3*b*e^2
*n*x^4 - 4*b*d*e*n*x^2 + 8*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/e^3, -1/225*(
120*b*sqrt(-d)*d^2*n*arctan(sqrt(-d)/sqrt(e*x^2 + d)) + (9*(b*e^2*n - 5*a*
e^2)*x^4 + 94*b*d^2*n - 120*a*d^2 - (17*b*d*e*n - 60*a*d*e)*x^2 - 15*(3*b*
e^2*x^4 - 4*b*d*e*x^2 + 8*b*d^2)*log(c) - 15*(3*b*e^2*n*x^4 - 4*b*d*e*n*x^
2 + 8*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/e^3]
```

3.276.6 Sympy [A] (verification not implemented)

Time = 17.14 (sec) , antiderivative size = 359, normalized size of antiderivative = 1.97

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = a\left(\begin{cases}\frac{8d^2\sqrt{d+ex^2}}{15e^3}-\frac{4dx^2\sqrt{d+ex^2}}{15e^2}+\frac{x^4\sqrt{d+ex^2}}{5e} & \text{for } e\neq 0\\ \frac{x^6}{6\sqrt{d}} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\left(\begin{cases}-\frac{8d^{\frac{5}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{15e^3}+\frac{8d^3}{15e^{\frac{7}{2}}x\sqrt{\frac{d}{ex^2}+1}}+\frac{8d^2x}{15e^{\frac{5}{2}}\sqrt{\frac{d}{ex^2}+1}}-\frac{4d\left(\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for } e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}\right)}{15e^2}+\frac{\begin{cases}-\frac{2d^2\sqrt{}}{15}\\ \frac{\sqrt{d}x^4}{4}\end{cases}}{} \\ \frac{x^6}{36\sqrt{d}}\end{cases}\right.\right.$$
$$+b\left(\begin{cases}\frac{8d^2\sqrt{d+ex^2}}{15e^3}-\frac{4dx^2\sqrt{d+ex^2}}{15e^2}+\frac{x^4\sqrt{d+ex^2}}{5e} & \text{for } e\neq 0\\ \frac{x^6}{6\sqrt{d}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

output
```
a*Piecewise((8*d**2*sqrt(d + e*x**2)/(15*e**3) - 4*d*x**2*sqrt(d + e*x**2)
/(15*e**2) + x**4*sqrt(d + e*x**2)/(5*e), Ne(e, 0)), (x**6/(6*sqrt(d)), Tr
ue)) - b*n*Piecewise((-8*d**(5/2)*asinh(sqrt(d)/(sqrt(e)*x))/(15*e**3) + 8
*d**3/(15*e**(7/2)*x*sqrt(d/(e*x**2) + 1)) + 8*d**2*x/(15*e**(5/2)*sqrt(d/
(e*x**2) + 1)) - 4*d*Piecewise((d*sqrt(d + e*x**2)/(3*e) + x**2*sqrt(d + e
*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))/(15*e**2) + Piecewise((-2*d**
2*sqrt(d + e*x**2)/(15*e**2) + d*x**2*sqrt(d + e*x**2)/(15*e) + x**4*sqrt(
d + e*x**2)/5, Ne(e, 0)), (sqrt(d)*x**4/4, True))/(5*e), (e > -oo) & (e <
oo) & Ne(e, 0)), (x**6/(36*sqrt(d)), True)) + b*Piecewise((8*d**2*sqrt(d +
 e*x**2)/(15*e**3) - 4*d*x**2*sqrt(d + e*x**2)/(15*e**2) + x**4*sqrt(d + e
*x**2)/(5*e), Ne(e, 0)), (x**6/(6*sqrt(d)), True))*log(c*x**n)
```

3.276.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.276.8 Giac [F]

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{\sqrt{ex^2+d}}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/sqrt(e*x^2 + d), x)
```

3.276.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{x^5\,(a+b\,\ln(c\,x^n))}{\sqrt{e\,x^2+d}}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2),x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2), x)
```

3.277 $\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$

3.277.1 Optimal result

Integrand size = 25, antiderivative size = 129

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \frac{2bdn\sqrt{d+ex^2}}{3e^2} - \frac{bn(d+ex^2)^{3/2}}{9e^2} - \frac{2bd^{3/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^2} - \frac{d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2} + \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}$$

output
```
-1/9*b*n*(e*x^2+d)^(3/2)/e^2-2/3*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/
2))/e^2+1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/e^2+2/3*b*d*n*(e*x^2+d)^(1/2)/
e^2-d*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e^2
```

3.277.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 145, normalized size of antiderivative = 1.12

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \frac{-6ad\sqrt{d+ex^2}+5bdn\sqrt{d+ex^2}+3aex^2\sqrt{d+ex^2}-benx^2\sqrt{d+ex^2}+6bd^{3/2}n\log(x)+3b(-2d+ex^2)\sqrt{\ldots}}{9e^2}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
(-6*a*d*Sqrt[d + e*x^2] + 5*b*d*n*Sqrt[d + e*x^2] + 3*a*e*x^2*Sqrt[d + e*x
^2] - b*e*n*x^2*Sqrt[d + e*x^2] + 6*b*d^(3/2)*n*Log[x] + 3*b*(-2*d + e*x^2
)*Sqrt[d + e*x^2]*Log[c*x^n] - 6*b*d^(3/2)*n*Log[d + Sqrt[d]*Sqrt[d + e*x^
2]])/(9*e^2)
```

3.277.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 123, normalized size of antiderivative = 0.95, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.280, Rules used = {2792, 27, 354, 90, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int -\frac{(2d-ex^2)\sqrt{ex^2+d}}{3e^2x}dx+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{bn\int \frac{(2d-ex^2)\sqrt{ex^2+d}}{x}dx}{3e^2}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 354}$$

$$\frac{bn\int \frac{(2d-ex^2)\sqrt{ex^2+d}}{x^2}dx^2}{6e^2}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 90}$$

$$\frac{bn\left(2d\int \frac{\sqrt{ex^2+d}}{x^2}dx^2-\frac{2}{3}(d+ex^2)^{3/2}\right)}{6e^2}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 60}$$

$$\frac{bn\left(2d\left(d\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)-\frac{2}{3}(d+ex^2)^{3/2}\right)}{6e^2}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}$$

$$\Big\downarrow \text{ 73}$$

$$\frac{bn\left(2d\left(\frac{2d\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)-\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)}{6e^2}+\frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log\left(cx^n\right))}{e^2}$$

$$\Big\downarrow \text{221}$$

$$\frac{\left(d+ex^2\right)^{3/2}\left(a+b\log\left(cx^n\right)\right)}{3e^2}-\frac{d\sqrt{d+ex^2}(a+b\log\left(cx^n\right))}{e^2}+\frac{bn\left(2d\left(2\sqrt{d+ex^2}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)-\frac{2}{3}\left(d+ex^2\right)^{3/2}\right)}{6e^2}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
(b*n*((-2*(d + e*x^2)^(3/2))/3 + 2*d*(2*Sqrt[d + e*x^2] - 2*Sqrt[d]*ArcTan
h[Sqrt[d + e*x^2]/Sqrt[d]])))/(6*e^2) - (d*Sqrt[d + e*x^2]*(a + b*Log[c*x^
n]))/e^2 + ((d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^2)
```

3.277.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.277.4 Maple [F]

$$\int \frac{x^3(a+b\ln(c\,x^n))}{\sqrt{e\,x^2+d}}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

3.277.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 207, normalized size of antiderivative = 1.60

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$$
$$= \left[\frac{3\,bd^{\frac{3}{2}}n\log\left(-\frac{ex^2-2\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)+(5\,bdn-(ben-3\,ae)x^2-6\,ad+3\,(bex^2-2\,bd)\log(c)+3\,(benx^2-}{9\,e^2}\right.$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/9*(3*b*d^(3/2)*n*log(-(e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2) +
(5*b*d*n - (b*e*n - 3*a*e)*x^2 - 6*a*d + 3*(b*e*x^2 - 2*b*d)*log(c) + 3*(b
*e*n*x^2 - 2*b*d*n)*log(x))*sqrt(e*x^2 + d))/e^2, 1/9*(6*b*sqrt(-d)*d*n*ar
ctan(sqrt(-d)/sqrt(e*x^2 + d)) + (5*b*d*n - (b*e*n - 3*a*e)*x^2 - 6*a*d +
3*(b*e*x^2 - 2*b*d)*log(c) + 3*(b*e*n*x^2 - 2*b*d*n)*log(x))*sqrt(e*x^2 +
d))/e^2]
```

3.277.6 Sympy [A] (verification not implemented)

Time = 12.28 (sec) , antiderivative size = 236, normalized size of antiderivative = 1.83

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = a\left(\begin{cases} -\frac{2d\sqrt{d+ex^2}}{3e^2}+\frac{x^2\sqrt{d+ex^2}}{3e} & \text{for}\ e\neq 0 \\ \frac{x^4}{4\sqrt{d}} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases}\begin{cases}\frac{2d^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{3e^2}-\frac{2d^2}{3e^{\frac{5}{2}}x\sqrt{\frac{d}{ex^2}+1}}-\frac{2dx}{3e^{\frac{3}{2}}\sqrt{\frac{d}{ex^2}+1}}+\frac{\begin{cases}\frac{d\sqrt{d+ex^2}}{3e}+\frac{x^2\sqrt{d+ex^2}}{3} & \text{for}\ e\neq 0\\ \frac{\sqrt{d}x^2}{2} & \text{otherwise}\end{cases}}{3e} & \text{for}\ e>-\infty\wedge e< \\ \frac{x^4}{16\sqrt{d}} & \text{otherwise}\end{cases}\end{cases}\right.$$
$$+b\left(\begin{cases}-\frac{2d\sqrt{d+ex^2}}{3e^2}+\frac{x^2\sqrt{d+ex^2}}{3e} & \text{for}\ e\neq 0\\ \frac{x^4}{4\sqrt{d}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

output
```
a*Piecewise((-2*d*sqrt(d + e*x**2)/(3*e**2) + x**2*sqrt(d + e*x**2)/(3*e),
 Ne(e, 0)), (x**4/(4*sqrt(d)), True)) - b*n*Piecewise((2*d**(3/2)*asinh(sq
rt(d)/(sqrt(e)*x))/(3*e**2) - 2*d**2/(3*e**(5/2)*x*sqrt(d/(e*x**2) + 1)) -
 2*d*x/(3*e**(3/2)*sqrt(d/(e*x**2) + 1)) + Piecewise((d*sqrt(d + e*x**2)/(
3*e) + x**2*sqrt(d + e*x**2)/3, Ne(e, 0)), (sqrt(d)*x**2/2, True))/(3*e),
(e > -oo) & (e < oo) & Ne(e, 0)), (x**4/(16*sqrt(d)), True)) + b*Piecewise
((-2*d*sqrt(d + e*x**2)/(3*e**2) + x**2*sqrt(d + e*x**2)/(3*e), Ne(e, 0)),
 (x**4/(4*sqrt(d)), True))*log(c*x**n)
```

3.277.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.277.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{\sqrt{ex^2+d}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/sqrt(e*x^2 + d), x)
```

3.277.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{\sqrt{e\,x^2+d}}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2), x)
```

3.278 $\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$

3.278.1 Optimal result

Integrand size = 23, antiderivative size = 73

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{e}+\frac{b\sqrt{d}n\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{e}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e}$$

output
```
b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*d^(1/2)/e-b*n*(e*x^2+d)^(1/2)/e+(a+b*
ln(c*x^n))*(e*x^2+d)^(1/2)/e
```

3.278.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 91, normalized size of antiderivative = 1.25

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \frac{a\sqrt{d+ex^2}-bn\sqrt{d+ex^2}-b\sqrt{d}n\log(x)+b\sqrt{d+ex^2}\log(cx^n)+b\sqrt{d}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{e}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
(a*Sqrt[d + e*x^2] - b*n*Sqrt[d + e*x^2] - b*Sqrt[d]*n*Log[x] + b*Sqrt[d +
 e*x^2]*Log[c*x^n] + b*Sqrt[d]*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/e
```

3.278.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 74, normalized size of antiderivative = 1.01, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.217, Rules used = {2776, 243, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}dx$$

$$\Big\downarrow \text{2776}$$

$$\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e}-\frac{bn\int \frac{\sqrt{ex^2+d}}{x}dx}{e}$$

$$\Big\downarrow \text{243}$$

$$\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e}-\frac{bn\int \frac{\sqrt{ex^2+d}}{x^2}dx^2}{2e}$$

$$\Big\downarrow \text{60}$$

$$\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e}-\frac{bn\left(d\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)}{2e}$$

$$\Big\downarrow \text{73}$$

$$\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e}-\frac{bn\left(\frac{2d\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)}{2e}$$

$$\Big\downarrow \text{221}$$

$$\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e}-\frac{bn\left(2\sqrt{d+ex^2}-2\sqrt{d}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)}{2e}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
-1/2*(b*n*(2*Sqrt[d + e*x^2] - 2*Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])
)/e + (Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/e
```

3.278.3.1 Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

3.278.4 Maple [F]

$$\int \frac{x(a+b\ln(c\,x^{n}))}{\sqrt{e\,x^{2}+d}}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

3.278.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.70

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \left[\frac{b\sqrt{d}n\log\left(-\frac{ex^2+2\sqrt{ex^2+d}\sqrt{d}+2d}{x^2}\right)+2\sqrt{ex^2+d}(bn\log(x)-bn+b\log(c)+a)}{2e}, -\frac{b\sqrt{-d}n\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex^2+d}}\right)-\sqrt{ex^2+d}(bn\log(x)-bn+b\log(c)+a)}{e}\right]$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/2*(b*sqrt(d)*n*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2) + 2*
sqrt(e*x^2 + d)*(b*n*log(x) - b*n + b*log(c) + a))/e, -(b*sqrt(-d)*n*arcta
n(sqrt(-d)/sqrt(e*x^2 + d)) - sqrt(e*x^2 + d)*(b*n*log(x) - b*n + b*log(c)
 + a))/e]
```

3.278.6 Sympy [A] (verification not implemented)

Time = 2.17 (sec) , antiderivative size = 129, normalized size of antiderivative = 1.77

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = a\left(\begin{cases}\frac{\sqrt{d+ex^2}}{e} & \text{for } e\neq 0\\ \frac{x^2}{2\sqrt{d}} & \text{otherwise}\end{cases}\right) - bn\left(\begin{cases}-\frac{\sqrt{d}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{e}+\frac{d}{e^{\frac{3}{2}}x\sqrt{\frac{d}{ex^2}+1}}+\frac{x}{\sqrt{e}\sqrt{\frac{d}{ex^2}+1}} & \text{for } e>-\infty\wedge e<\infty\wedge e\neq 0\\ \frac{x^2}{4\sqrt{d}} & \text{otherwise}\end{cases}\right) + b\left(\begin{cases}\frac{\sqrt{d+ex^2}}{e} & \text{for } e\neq 0\\ \frac{x^2}{2\sqrt{d}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

output
```
a*Piecewise((sqrt(d + e*x**2)/e, Ne(e, 0)), (x**2/(2*sqrt(d)), True)) - b*
n*Piecewise((-sqrt(d)*asinh(sqrt(d)/(sqrt(e)*x))/e + d/(e**(3/2)*x*sqrt(d/
(e*x**2) + 1)) + x/(sqrt(e)*sqrt(d/(e*x**2) + 1)), (e > -oo) & (e < oo) &
Ne(e, 0)), (x**2/(4*sqrt(d)), True)) + b*Piecewise((sqrt(d + e*x**2)/e, Ne
(e, 0)), (x**2/(2*sqrt(d)), True))*log(c*x**n)
```

3.278.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x(a + b\log(cx^n))}{\sqrt{d + ex^2}} dx = \text{Exception raised: ValueError}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.278.8 Giac [F]

$$\int \frac{x(a + b\log(cx^n))}{\sqrt{d + ex^2}} dx = \int \frac{(b\log(cx^n) + a)x}{\sqrt{ex^2 + d}} dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/sqrt(e*x^2 + d), x)
```

3.278.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{\sqrt{e\,x^2+d}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2), x)
```

3.279 $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx$

3.279.1 Optimal result

Integrand size = 25, antiderivative size = 166

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx = \frac{bn\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2\sqrt{d}} - \frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}} - \frac{bn\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{\sqrt{d}} - \frac{bn\,\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2\sqrt{d}}$$

output
```
1/2*b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))^2/d^(1/2)-arctanh((e*x^2+d)^(1/2)
/d^(1/2))*(a+b*ln(c*x^n))/d^(1/2)-b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(
2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(1/2)-1/2*b*n*polylog(2,1-2*d^(1/2)
/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(1/2)
```

3.279.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.13 (sec) , antiderivative size = 162, normalized size of antiderivative = 0.98

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx = \frac{bn\sqrt{1+\frac{d}{ex^2}}\left(-{}_3F_2\left(\frac{1}{2},\frac{1}{2},\frac{1}{2};\frac{3}{2},\frac{3}{2};-\frac{d}{ex^2}\right)-\frac{\sqrt{e}x\,\text{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\log(x)}{\sqrt{d}}\right)}{\sqrt{d+ex^2}} - \frac{\log(x)\left(-a-b(-n\log(x)+\log(cx^n))\right)}{\sqrt{d}} + \frac{\left(-a-b(-n\log(x)+\log(cx^n))\right)\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{\sqrt{d}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^2]),x]
```

output
```
(b*n*Sqrt[1 + d/(e*x^2)]*(-HypergeometricPFQ[{1/2, 1/2, 1/2}, {3/2, 3/2},
-(d/(e*x^2))] - (Sqrt[e]*x*ArcSinh[Sqrt[d]/(Sqrt[e]*x)]*Log[x])/Sqrt[d]))/
Sqrt[d + e*x^2] - (Log[x]*(-a - b*(-(n*Log[x]) + Log[c*x^n])))/Sqrt[d] + (
(-a - b*(-(n*Log[x]) + Log[c*x^n]))*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/Sqrt
[d]
```

3.279.3 Rubi [A] (verified)

Time = 0.76 (sec) , antiderivative size = 154, normalized size of antiderivative = 0.93, number of steps used = 13, number of rules used = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.480$, Rules used = {2790, 25, 27, 7282, 7267, 25, 6546, 27, 6470, 27, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx$$

$$\Big\downarrow \text{2790}$$

$$-bn\int -\frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{\sqrt{d}x}dx-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{25}$$

$$bn\int \frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{\sqrt{d}x}dx-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 7282}$$

$$\frac{bn\int \frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{x^2}dx^2}{2\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 7267}$$

$$\frac{bn\int -\frac{\sqrt{ex^2+d}\,\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d-x^4}d\sqrt{ex^2+d}}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 25}$$

$$-\frac{bn\int \frac{\sqrt{ex^2+d}\,\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d-x^4}d\sqrt{ex^2+d}}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 6546}$$

$$\frac{bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\frac{\int \frac{\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{ex^2+d}}d\sqrt{ex^2+d}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\int \frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{ex^2+d}}d\sqrt{ex^2+d}\right)}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 6470}$$

$$\frac{bn\left(\frac{\int \frac{d\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^2+d}}\right)}{d-x^4}d\sqrt{ex^2+d}}{\sqrt{d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\right)}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{ 27}$$

3.279. $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx$

$$\frac{bn\left(\sqrt{d}\int \frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^2+d}}\right)}{d-x^4}d\sqrt{ex^2+d}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\right)}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{2849}$$

$$\frac{bn\left(-\sqrt{d}\int \frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^2+d}}\right)}{1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^2+d}}}d\frac{1}{\sqrt{d}-\sqrt{ex^2+d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)\right)}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

$$\Big\downarrow \text{2752}$$

$$\frac{bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^2+d}}\right)\right)}{\sqrt{d}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}}$$

input
```
Int[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^2]),x]
```

output
```
-((ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*(a + b*Log[c*x^n]))/Sqrt[d]) + (b*n*(A
rcTanh[Sqrt[d + e*x^2]/Sqrt[d]]^2/2 - ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*Log
[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])] - PolyLog[2, 1 - (2*Sqrt[d])/(Sq
rt[d] - Sqrt[d + e*x^2])]/2))/Sqrt[d]
```

3.279.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

rule 7282
```
Int[(u_)/(x_), x_Symbol] :> With[{lst = PowerVariableExpn[u, 0, x]}, Simp[1
/lst[[2]]   Subst[Int[NormalizeIntegrand[Simplify[lst[[1]]/x], x], x], x, (
lst[[3]]*x)^lst[[2]]], x] /;  !FalseQ[lst] && NeQ[lst[[2]], 0]] /; NonsumQ[
u] &&  !RationalFunctionQ[u, x]
```

3.279. $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx$

3.279.4 Maple [F]

$$\int \frac{a+b\ln \left(c\,x^{n}\right)}{x\sqrt{e\,x^{2}+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^(1/2),x)
```

3.279.5 Fricas [F]

$$\int \frac{a+b\log \left(cx^{n}\right)}{x\sqrt{d+ex^{2}}}\,dx=\int \frac{b\log \left(cx^{n}\right)+a}{\sqrt{ex^{2}+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e*x^3 + d*x),
 x)
```

3.279.6 Sympy [F]

$$\int \frac{a+b\log \left(cx^{n}\right)}{x\sqrt{d+ex^{2}}}\,dx=\int \frac{a+b\log \left(cx^{n}\right)}{x\sqrt{d+ex^{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*sqrt(d + e*x**2)), x)
```

3.279.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.279.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex^2+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x^2 + d)*x), x)
```

3.279.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,\sqrt{e\,x^2+d}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^(1/2)), x)
```

3.280 $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx$

3.280.1 Optimal result

Integrand size = 25, antiderivative size = 258

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{4dx^2} - \frac{ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{3/2}} - \frac{ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{3/2}} - \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2dx^2} + \frac{e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}} + \frac{ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2d^{3/2}} + \frac{ben\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{4d^{3/2}}$$

output
```
-1/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(3/2)-1/4*b*e*n*arctanh((e*x
^2+d)^(1/2)/d^(1/2))^2/d^(3/2)+1/2*e*arctanh((e*x^2+d)^(1/2)/d^(1/2))*(a+b
*ln(c*x^n))/d^(3/2)+1/2*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2
)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(3/2)+1/4*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1
/2)-(e*x^2+d)^(1/2)))/d^(3/2)-1/4*b*n*(e*x^2+d)^(1/2)/d/x^2-1/2*(a+b*ln(c*
x^n))*(e*x^2+d)^(1/2)/d/x^2
```

3.280.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.67 (sec) , antiderivative size = 229, normalized size of antiderivative = 0.89

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx = \frac{\frac{bn\sqrt{1+\frac{d}{ex^2}}\left(2d^{3/2}\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{d}{ex^2}\right)+9ex^2\left(-\sqrt{d}\sqrt{1+\frac{d}{ex^2}}+\sqrt{e}x\,\text{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\right)(1+2\log(x))\right)}{x^2\sqrt{d+ex^2}}-\frac{18\sqrt{d}\sqrt{d+ex^2}(a-bn\log(x)+b\log(c}{x^2}}{36d^{}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*Sqrt[d + e*x^2]),x]
```

output
```
((b*n*Sqrt[1 + d/(e*x^2)]*(2*d^(3/2)*HypergeometricPFQ[{3/2, 3/2, 3/2}, {5
/2, 5/2}, -(d/(e*x^2))] + 9*e*x^2*(-(Sqrt[d]*Sqrt[1 + d/(e*x^2)]) + Sqrt[e
]*x*ArcSinh[Sqrt[d]/(Sqrt[e]*x)])*(1 + 2*Log[x])))/(x^2*Sqrt[d + e*x^2]) -
 (18*Sqrt[d]*Sqrt[d + e*x^2]*(a - b*n*Log[x] + b*Log[c*x^n]))/x^2 - 18*e*L
og[x]*(a - b*n*Log[x] + b*Log[c*x^n]) + 18*e*(a - b*n*Log[x] + b*Log[c*x^n
])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(36*d^(3/2))
```

3.280.3 Rubi [A] (verified)

Time = 0.67 (sec) , antiderivative size = 252, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.160, Rules used = {2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{\frac{\sqrt{ex^2+d}}{d}-\frac{ex^2\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d^{3/2}}}{2x^3}dx+\frac{e\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2dx^2}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}bn\int \frac{\frac{\sqrt{ex^2+d}}{d}-\frac{ex^2\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d^{3/2}}}{x^3}dx+\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2dx^2}$$

$\big\downarrow$ 2010

$$\frac{1}{2}bn\int \left(\frac{\sqrt{ex^2+d}}{dx^3}-\frac{e\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d^{3/2}x}\right)dx+\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2dx^2}$$

$\big\downarrow$ 2009

$$\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{3/2}}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{2dx^2}+\frac{1}{2}bn\left(-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{3/2}}-\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{2d^{3/2}}+\frac{e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{d^{3/2}}+\frac{e\text{PolyLog}\left(2,1-\frac{}{\sqrt{}}\right.}{2d^{3/2}}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*Sqrt[d + e*x^2]),x]
```

output
```
-1/2*(Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(d*x^2) + (e*ArcTanh[Sqrt[d + e*
x^2]/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*d^(3/2)) + (b*n*(-1/2*Sqrt[d + e*x^2]
/(d*x^2) - (e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(2*d^(3/2)) - (e*ArcTanh[S
qrt[d + e*x^2]/Sqrt[d]]^2)/(2*d^(3/2)) + (e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d
]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/d^(3/2) + (e*PolyLog[2, 1
 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(2*d^(3/2))))/2
```

3.280.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.280.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{3}\sqrt{e\,x^{2}+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(1/2),x)
```

3.280.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\sqrt{d+ex^{2}}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\sqrt{ex^{2}+d}x^{3}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e*x^5 + d*x^3
), x)
```

3.280.6 Sympy [F]

$$\int \frac{a + b\log(cx^n)}{x^3\sqrt{d + ex^2}}\,dx = \int \frac{a + b\log(cx^n)}{x^3\sqrt{d + ex^2}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**3*sqrt(d + e*x**2)), x)
```

3.280.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx^n)}{x^3\sqrt{d + ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.280.8 Giac [F]

$$\int \frac{a + b\log(cx^n)}{x^3\sqrt{d + ex^2}}\,dx = \int \frac{b\log(cx^n) + a}{\sqrt{ex^2 + d}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x^2 + d)*x^3), x)
```

3.280.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d+ex^2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^3\,\sqrt{e\,x^2+d}}\,dx$$

input

```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(1/2)),x)
```

output

```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(1/2)), x)
```

3.281 $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$

3.281.1 Optimal result

Integrand size = 25, antiderivative size = 359

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx =& -\frac{bnx\sqrt{d+ex^2}}{4e}-\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{4e^{3/2}\sqrt{d+ex^2}}\\
&-\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{4e^{3/2}\sqrt{d+ex^2}}\\
&+\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{3/2}\sqrt{d+ex^2}}\\
&+\frac{x\sqrt{d+ex^2}(a+b\log(cx^n))}{2e}\\
&-\frac{d^{3/2}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}\sqrt{d+ex^2}}\\
&+\frac{bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{4e^{3/2}\sqrt{d+ex^2}}\end{aligned}$$

output
```
-1/4*b*n*x*(e*x^2+d)^(1/2)/e+1/2*x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e-1/4*b
*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*(1+e*x^2/d)^(1/2)/e^(3/2)/(e*x^2+d)^
(1/2)-1/4*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))^2*(1+e*x^2/d)^(1/2)/e^(3/
2)/(e*x^2+d)^(1/2)+1/2*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1
/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(1+e*x^2/d)^(1/2)/e^(3/2)/(e*x^2+d)^(1/2
)-1/2*d^(3/2)*arcsinh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*(1+e*x^2/d)^(1/2)
/e^(3/2)/(e*x^2+d)^(1/2)+1/4*b*d^(3/2)*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e
*x^2/d)^(1/2))^2)*(1+e*x^2/d)^(1/2)/e^(3/2)/(e*x^2+d)^(1/2)
```

3.281.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.51 (sec) , antiderivative size = 205, normalized size of antiderivative = 0.57

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \frac{\frac{bn\sqrt{1+\frac{ex^2}{d}}\left(2e^2x^3\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)+9d\sqrt{e}\left(\sqrt{e}x\sqrt{1+\frac{ex^2}{d}}-\sqrt{d}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\right)(-1+2\log(x))\right)}{\sqrt{d+ex^2}}+18ex\sqrt{d+ex^2}(a-bn\log$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

output
```
((b*n*Sqrt[1 + (e*x^2)/d]*(2*e^2*x^3*HypergeometricPFQ[{3/2, 3/2, 3/2}, {5
/2, 5/2}, -((e*x^2)/d)] + 9*d*Sqrt[e]*(Sqrt[e]*x*Sqrt[1 + (e*x^2)/d] - Sqr
t[d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])*(-1 + 2*Log[x])))/Sqrt[d + e*x^2] + 18*
e*x*Sqrt[d + e*x^2]*(a - b*n*Log[x] + b*Log[c*x^n]) - 18*d*Sqrt[e]*(a - b*
n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(36*e^2)
```

3.281.3 Rubi [A] (verified)

Time = 0.67 (sec) , antiderivative size = 263, normalized size of antiderivative = 0.73, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {2786, 2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}dx$$

$$\Big\downarrow \ 2786$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\int \frac{x^2(a+b\log(cx^n))}{\sqrt{\frac{ex^2}{d}+1}}dx}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 2792$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-bn\int \frac{\frac{dx\sqrt{\frac{ex^2}{d}+1}}{e}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}}}{2x}dx-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{2e}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 27$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-\frac{1}{2}bn\int \frac{\frac{dx\sqrt{\frac{ex^2}{d}+1}}{e}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}}}{x}dx-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{2e}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 2010$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-\frac{1}{2}bn\int \left(\frac{d\sqrt{\frac{ex^2}{d}+1}}{e}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}x}\right)dx-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{2e}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 2009$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{3/2}}+\frac{dx\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{2e}-\frac{1}{2}bn\left(-\frac{d^{3/2}\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{3/2}}+\frac{d^{3/2}\text{ar}\ldots}{}\right.\right.}{\sqrt{d+ex^2}}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/Sqrt[d + e*x^2],x]
```

3.281. $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}dx$

output
```
(Sqrt[1 + (e*x^2)/d]*((d*x*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(2*e) -
 (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*e^(3/2)) - (
b*n*((d*x*Sqrt[1 + (e*x^2)/d])/(2*e) + (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d
]])/(2*e^(3/2)) + (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(2*e^(3/2)) - (
d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt
[d]])])/e^(3/2) - (d^(3/2)*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])
/(2*e^(3/2))))/2))/Sqrt[d + e*x^2]
```

3.281.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.281. $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$

3.281.4 Maple [F]

$$\int \frac{x^2(a+b\ln(c\,x^n))}{\sqrt{e\,x^2+d}}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

3.281.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{\sqrt{ex^2+d}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*x^2*log(c*x^n) + sqrt(e*x^2 + d)*a*x^2)/(e*x^2
 + d), x)
```

3.281.6 Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/sqrt(d + e*x**2), x)
```

3.281.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.281.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{\sqrt{ex^2+d}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/sqrt(e*x^2 + d), x)
```

3.281.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d+ex^2}}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{\sqrt{e\,x^2+d}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(1/2), x)
```

3.282 $\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}\,dx$

3.282.1 Optimal result

Integrand size = 22, antiderivative size = 250

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}\,dx = \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{2\sqrt{e}\sqrt{d+ex^2}} - \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{\sqrt{e}\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}\sqrt{d+ex^2}} - \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2\sqrt{e}\sqrt{d+ex^2}}$$

output
```
1/2*b*n*arcsinh(x*e^(1/2)/d^(1/2))^2*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*
x^2+d)^(1/2)-b*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x
^2/d)^(1/2))^2)*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)+arcsinh(
x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^
2+d)^(1/2)-1/2*b*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*d^(1
/2)*(1+e*x^2/d)^(1/2)/e^(1/2)/(e*x^2+d)^(1/2)
```

3.282.2 Mathematica [A] (verified)

Time = 0.36 (sec) , antiderivative size = 186, normalized size of antiderivative = 0.74

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}\,dx = \frac{(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{\sqrt{e}} + \frac{bn\sqrt{1+\frac{ex^2}{d}}\left(-\operatorname{arcsinh}\left(\sqrt{\frac{e}{d}}x\right)^2-2\operatorname{arcsinh}\left(\sqrt{\frac{e}{d}}x\right)\log\left(1-e^{-2\operatorname{arcsinh}\left(\sqrt{\frac{e}{d}}x\right)}\right)+2\log(x)\log\left(\sqrt{\frac{e}{d}}x+\sqrt{\right.\right.}{2\sqrt{\frac{e}{d}}\sqrt{d+ex^2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/Sqrt[d + e*x^2],x]
```

output
```
((a - b*n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/Sqrt[
e] + (b*n*Sqrt[1 + (e*x^2)/d]*(-ArcSinh[Sqrt[e/d]*x]^2 - 2*ArcSinh[Sqrt[e/
d]*x]*Log[1 - E^(-2*ArcSinh[Sqrt[e/d]*x])] + 2*Log[x]*Log[Sqrt[e/d]*x + Sq
rt[1 + (e*x^2)/d]] + PolyLog[2, E^(-2*ArcSinh[Sqrt[e/d]*x])]))/(2*Sqrt[e/d
]*Sqrt[d + e*x^2])
```

3.282.3 Rubi [C] (verified)

Result contains complex when optimal does not.

Time = 0.57 (sec) , antiderivative size = 166, normalized size of antiderivative = 0.66, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.455$, Rules used = {2764, 2762, 6190, 3042, 26, 4199, 25, 2620, 2715, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}dx$$

$$\Big\downarrow \text{2764}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\int \frac{a+b\log(cx^n)}{\sqrt{\frac{ex^2}{d}+1}}dx}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{2762}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int\frac{\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{x}dx}{\sqrt{e}}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \; 6190$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int\frac{\sqrt{d}\sqrt{\frac{ex^2}{d}+1}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}x}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \; 3042$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}-\frac{b\sqrt{d}n\int -i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\tan\left(i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)+\frac{\pi}{2}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \; 26$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\int \text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\tan\left(i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)+\frac{\pi}{2}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{\sqrt{e}}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \; 4199$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(2i\int -\frac{e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2\right)}{\sqrt{e}}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \; 25$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\int \frac{e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}}d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}i\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2\right)}{\sqrt{e}}\right)}{\sqrt{d+ex^2}}$$

$$\Big\downarrow \; 2620$$

3.282. $\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}\,dx$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(\frac{1}{2}\int\log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)d\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)-\frac{1}{2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-\right.\right.\right.}{\sqrt{e}}\right.}{\sqrt{d+ex^2}}$$

$\downarrow$ 2715

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(\frac{1}{4}\int e^{-2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)de^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}-\frac{1}{2}\text{arcsi}\right.\right.}{\sqrt{e}}\right.}{\sqrt{d+ex^2}}$$

$\downarrow$ 2838

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{\sqrt{d}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{e}}+\frac{ib\sqrt{d}n\left(-2i\left(-\frac{1}{4}\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)-\frac{1}{2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right.\right.\right.}{\sqrt{e}}\right.}{\sqrt{d+ex^2}}$$

input
```
Int[(a + b*Log[c*x^n])/Sqrt[d + e*x^2],x]
```

output
```
(Sqrt[1 + (e*x^2)/d]*((Sqrt[d]*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x
^n]))/Sqrt[e] + (I*b*Sqrt[d]*n*((-1/2*I)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2 -
(2*I)*(-1/2*(ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)
/Sqrt[d]])]) - PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])]/4)))/Sqrt[e]
))/Sqrt[d + e*x^2]
```

3.282.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 26
```
Int[(Complex[0, a_])*(Fx_), x_Symbol] :> Simp[(Complex[Identity[0], a])   I
nt[Fx, x], x] /; FreeQ[a, x] && EqQ[a^2, 1]
```

3.282. $\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}\,dx$

rule 2620
```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[d*(m/(b*f*g*n*Log[F]))   Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x
)))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

rule 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[1/(d*e*n*Log[F])   Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x)
))^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

rule 2762
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]*((a + b*Log[c*x^n])/Rt[e, 2]), x]
 - Simp[b*(n/Rt[e, 2])   Int[ArcSinh[Rt[e, 2]*(x/Sqrt[d])]/x, x], x] /; Fre
eQ[{a, b, c, d, e, n}, x] && GtQ[d, 0] && PosQ[e]
```

rule 2764
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[Sqrt[1 + (e/d)*x^2]/Sqrt[d + e*x^2]   Int[(a + b*Log[c*x^n])/Sq
rt[1 + (e/d)*x^2], x], x] /; FreeQ[{a, b, c, d, e, n}, x] &&  !GtQ[d, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4199
```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (Complex[0, fz_])*(f_
.)*(x_)], x_Symbol] :> Simp[(-I)*((c + d*x)^(m + 1)/(d*(m + 1))), x] + Simp
[2*I   Int[((c + d*x)^m*(E^(2*((-I)*e + f*fz*x))/(1 + E^(2*((-I)*e + f*fz*x
))/E^(2*I*k*Pi))))/E^(2*I*k*Pi), x], x] /; FreeQ[{c, d, e, f, fz}, x] && In
tegerQ[4*k] && IGtQ[m, 0]
```

rule 6190
```
Int[((a_.) + ArcSinh[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Simp[1/b
 Subst[Int[x^n*Coth[-a/b + x/b], x], x, a + b*ArcSinh[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[n, 0]
```

3.282. $\int \frac{a+b\log(cx^n)}{\sqrt{d+ex^2}}\,dx$

3.282.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\sqrt{e\,x^{2}+d}}dx$$

input
```
int((a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/(e*x^2+d)^(1/2),x)
```

3.282.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{\sqrt{d+ex^{2}}}\,dx = \int \frac{b\log\left(cx^{n}\right)+a}{\sqrt{ex^{2}+d}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e*x^2 + d), x
)
```

3.282.6 Sympy [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{\sqrt{d+ex^{2}}}\,dx = \int \frac{a+b\log\left(cx^{n}\right)}{\sqrt{d+ex^{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/sqrt(d + e*x**2), x)
```

3.282.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^n\right)}{\sqrt{d+ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.282.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\sqrt{d+ex^2}}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\sqrt{ex^2+d}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/sqrt(e*x^2 + d), x)
```

3.282.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{\sqrt{d+ex^2}}\,dx = \int \frac{a+b\,\ln\left(c\,x^n\right)}{\sqrt{e\,x^2+d}}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^2)^(1/2),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^2)^(1/2), x)
```

3.283 $\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx$

3.283.1 Optimal result

Integrand size = 25, antiderivative size = 81

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{dx}+\frac{b\sqrt{e}n\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{d}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{dx}$$

output
```
b*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))*e^(1/2)/d-b*n*(e*x^2+d)^(1/2)/d/x-(
a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/d/x
```

3.283.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 77, normalized size of antiderivative = 0.95

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx = \frac{-\left((a+bn)\sqrt{d+ex^2}\right)-b\sqrt{d+ex^2}\log(cx^n)+b\sqrt{e}nx\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{dx}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*Sqrt[d + e*x^2]),x]
```

output
```
(-((a + b*n)*Sqrt[d + e*x^2]) - b*Sqrt[d + e*x^2]*Log[c*x^n] + b*Sqrt[e]*n
*x*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(d*x)
```

3.283.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 78, normalized size of antiderivative = 0.96, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.160, Rules used = {2773, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx$$
$$\Big\downarrow \ 2773$$
$$\frac{bn\int \frac{\sqrt{ex^2+d}}{x^2}dx}{d}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{dx}$$
$$\Big\downarrow \ 247$$
$$\frac{bn\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)}{d}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{dx}$$
$$\Big\downarrow \ 224$$
$$\frac{bn\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)}{d}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{dx}$$
$$\Big\downarrow \ 219$$
$$\frac{bn\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)}{d}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{dx}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*Sqrt[d + e*x^2]),x]
```

output
```
(b*n*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])
)/d - (Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(d*x)
```

3.283.3.1 Defintions of rubi rules used

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

3.283.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{2}\sqrt{e\,x^{2}+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(1/2),x)
```

3.283.5 Fricas [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.57

$$\int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex^2}}\,dx = \left[\frac{b\sqrt{e}nx\log\left(-2\,ex^2 - 2\,\sqrt{ex^2 + d}\sqrt{e}x - d\right) - 2\,\sqrt{ex^2 + d}(bn\log(x) + bn + b\log(c) + a)}{2\,dx}, -\frac{b\sqrt{-e}nx\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^2+d}}\right) + \sqrt{ex^2 + d}(bn\log(x) + bn + b\log(c) + a)}{dx}\right]$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/2*(b*sqrt(e)*n*x*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x - d) - 2*sq
rt(e*x^2 + d)*(b*n*log(x) + b*n + b*log(c) + a))/(d*x), -(b*sqrt(-e)*n*x*a
rctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + sqrt(e*x^2 + d)*(b*n*log(x) + b*n + b*
log(c) + a))/(d*x)]
```

3.283.6 Sympy [F]

$$\int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex^2}}\,dx = \int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex^2}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*sqrt(d + e*x**2)), x)
```

3.283.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx^n)}{x^2\sqrt{d + ex^2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.283.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex^2+d}x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x^2 + d)*x^2), x)
```

3.283.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d+ex^2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,\sqrt{e\,x^2+d}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(1/2)), x)
```

3.284 $\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx$

3.284.1 Optimal result

Integrand size = 25, antiderivative size = 144

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx = \frac{2ben\sqrt{d+ex^2}}{3d^2x} - \frac{bn(d+ex^2)^{3/2}}{9d^2x^3} - \frac{2be^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3d^2} - \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3} + \frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}$$

output
```
-1/9*b*n*(e*x^2+d)^(3/2)/d^2/x^3-2/3*b*e^(3/2)*n*arctanh(x*e^(1/2)/(e*x^2+
d)^(1/2))/d^2+2/3*b*e*n*(e*x^2+d)^(1/2)/d^2/x-1/3*(a+b*ln(c*x^n))*(e*x^2+d
)^(1/2)/d/x^3+2/3*e*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/d^2/x
```

3.284.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 110, normalized size of antiderivative = 0.76

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx = \frac{\sqrt{d+ex^2}(-3ad-bdn+6aex^2+5benx^2) - 3b(d-2ex^2)\sqrt{d+ex^2}\log(cx^n) - 6be^{3/2}nx^3\log\left(ex+\sqrt{e}\sqrt{\right.}}{9d^2x^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*Sqrt[d + e*x^2]),x]
```

output
```
(Sqrt[d + e*x^2]*(-3*a*d - b*d*n + 6*a*e*x^2 + 5*b*e*n*x^2) - 3*b*(d - 2*e
*x^2)*Sqrt[d + e*x^2]*Log[c*x^n] - 6*b*e^(3/2)*n*x^3*Log[e*x + Sqrt[e]*Sqr
t[d + e*x^2]])/(9*d^2*x^3)
```

3.284.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 137, normalized size of antiderivative = 0.95, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.240, Rules used = {2792, 27, 358, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx$$

$$\Big\downarrow \ 2792$$

$$-bn\int -\frac{(d-2ex^2)\sqrt{ex^2+d}}{3d^2x^4}dx+\frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \ 27$$

$$\frac{bn\int \frac{(d-2ex^2)\sqrt{ex^2+d}}{x^4}dx}{3d^2}+\frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \ 358$$

$$\frac{bn\left(-2e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d^2}+\frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \ 247$$

$$\frac{bn\left(-2e\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d^2}+\frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \ 224$$

$$\frac{bn\left(-2e\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d^2}+\frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3}$$

$$\Big\downarrow \text{219}$$

$$\frac{2e\sqrt{d+ex^2}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{3dx^3}+\frac{bn\left(-2e\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{(d+ex^2)^{3/2}}{3x^3}\right)}{3d^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*Sqrt[d + e*x^2]),x]
```

output
```
(b*n*(-1/3*(d + e*x^2)^(3/2)/x^3 - 2*e*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*Arc
Tanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])))/(3*d^2) - (Sqrt[d + e*x^2]*(a + b*Log
[c*x^n]))/(3*d*x^3) + (2*e*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(3*d^2*x)
```

3.284.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.284.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{4}\sqrt{e\,x^{2}+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(1/2),x)
```

3.284.5 Fricas [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 223, normalized size of antiderivative = 1.55

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{4}\sqrt{d+ex^{2}}}\,dx$$
$$= \left[\frac{3\,be^{\frac{3}{2}}nx^{3}\log\left(-2\,ex^{2}+2\,\sqrt{ex^{2}+d}\sqrt{e}x-d\right)-\left(bdn-(5\,ben+6\,ae)x^{2}+3\,ad-3\,(2\,bex^{2}-bd)\log\left(c\right)-\right.}{9\,d^{2}x^{3}}\right.$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/9*(3*b*e^(3/2)*n*x^3*log(-2*e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(e)*x - d) -
(b*d*n - (5*b*e*n + 6*a*e)*x^2 + 3*a*d - 3*(2*b*e*x^2 - b*d)*log(c) - 3*(2
*b*e*n*x^2 - b*d*n)*log(x))*sqrt(e*x^2 + d))/(d^2*x^3), 1/9*(6*b*sqrt(-e)*
e*n*x^3*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) - (b*d*n - (5*b*e*n + 6*a*e)*x^
2 + 3*a*d - 3*(2*b*e*x^2 - b*d)*log(c) - 3*(2*b*e*n*x^2 - b*d*n)*log(x))*s
qrt(e*x^2 + d))/(d^2*x^3)]
```

3.284.6 Sympy [F]

$$\int \frac{a + b \log(cx^n)}{x^4\sqrt{d + ex^2}} \, dx = \int \frac{a + b \log(cx^n)}{x^4\sqrt{d + ex^2}} \, dx$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**4*sqrt(d + e*x**2)), x)
```

3.284.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b \log(cx^n)}{x^4\sqrt{d + ex^2}} \, dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.284.8 Giac [F]

$$\int \frac{a + b \log(cx^n)}{x^4\sqrt{d + ex^2}} \, dx = \int \frac{b \log(cx^n) + a}{\sqrt{ex^2 + d}x^4} \, dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x^2 + d)*x^4), x)
```

3.284.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d+ex^2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^4\,\sqrt{e\,x^2+d}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(1/2)), x)
```

3.285 $\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx$

3.285.1 Optimal result

Integrand size = 25, antiderivative size = 204

$$\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx = -\frac{8be^2n\sqrt{d+ex^2}}{15d^3x} - \frac{bn(d+ex^2)^{3/2}}{25d^2x^5} + \frac{26ben(d+ex^2)^{3/2}}{225d^3x^3} + \frac{8be^{5/2}n\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{15d^3} - \frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5} + \frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3} - \frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}$$

output
```
-1/25*b*n*(e*x^2+d)^(3/2)/d^2/x^5+26/225*b*e*n*(e*x^2+d)^(3/2)/d^3/x^3+8/1
5*b*e^(5/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d^3-8/15*b*e^2*n*(e*x^2+d
)^(1/2)/d^3/x-1/5*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/d/x^5+4/15*e*(a+b*ln(c*x
^n))*(e*x^2+d)^(1/2)/d^2/x^3-8/15*e^2*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/d^3/
x
```

3.285.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 147, normalized size of antiderivative = 0.72

$$\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx = -\frac{\sqrt{d+ex^2}(15a(3d^2-4dex^2+8e^2x^4)+bn(9d^2-17dex^2+94e^2x^4))+15b\sqrt{d+ex^2}(3d^2-4dex^2+8e^2}{225d^3x^5}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^6*Sqrt[d + e*x^2]),x]
```

output
```
-1/225*(Sqrt[d + e*x^2]*(15*a*(3*d^2 - 4*d*e*x^2 + 8*e^2*x^4) + b*n*(9*d^2
 - 17*d*e*x^2 + 94*e^2*x^4)) + 15*b*Sqrt[d + e*x^2]*(3*d^2 - 4*d*e*x^2 + 8
*e^2*x^4)*Log[c*x^n] - 120*b*e^(5/2)*n*x^5*Log[e*x + Sqrt[e]*Sqrt[d + e*x^
2]])/(d^3*x^5)
```

3.285.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 196, normalized size of antiderivative = 0.96, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.320$, Rules used = {2792, 27, 1588, 27, 358, 247, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{\sqrt{ex^2+d}(8e^2x^4-4dex^2+3d^2)}{15d^3x^6}dx-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int\frac{\sqrt{ex^2+d}(8e^2x^4-4dex^2+3d^2)}{x^6}dx}{15d^3}-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{1588}$$

$$\frac{bn\left(-\frac{\int\frac{2de(13d-20ex^2)\sqrt{ex^2+d}}{x^4}dx}{5d}-\frac{3d(d+ex^2)^{3/2}}{5x^5}\right)}{15d^3}-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\left(-\frac{2}{5}e\int \frac{(13d-20ex^2)\sqrt{ex^2+d}}{x^4}dx-\frac{3d(d+ex^2)^{3/2}}{5x^5}\right)}{15d^3}-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \ 358$$

$$\frac{bn\left(-\frac{2}{5}e\left(-20e\int \frac{\sqrt{ex^2+d}}{x^2}dx-\frac{13(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3d(d+ex^2)^{3/2}}{5x^5}\right)}{15d^3}-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \ 247$$

$$\frac{bn\left(-\frac{2}{5}e\left(-20e\left(e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{13(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3d(d+ex^2)^{3/2}}{5x^5}\right)}{15d^3}-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \ 224$$

$$\frac{bn\left(-\frac{2}{5}e\left(-20e\left(e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{13(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3d(d+ex^2)^{3/2}}{5x^5}\right)}{15d^3}-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}$$

$$\Big\downarrow \ 219$$

$$-\frac{8e^2\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^3x}+\frac{4e\sqrt{d+ex^2}(a+b\log(cx^n))}{15d^2x^3}-\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{5dx^5}+\frac{bn\left(-\frac{2}{5}e\left(-20e\left(\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)-\frac{13(d+ex^2)^{3/2}}{3x^3}\right)-\frac{3d(d+ex^2)^{3/2}}{5x^5}\right)}{15d^3}$$

input
```
Int[(a + b*Log[c*x^n])/(x^6*Sqrt[d + e*x^2]),x]
```

output
```
(b*n*((-3*d*(d + e*x^2)^(3/2))/(5*x^5) - (2*e*((-13*(d + e*x^2)^(3/2))/(3*
x^3) - 20*e*(-(Sqrt[d + e*x^2]/x) + Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e
*x^2]])))/5))/(15*d^3) - (Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(5*d*x^5) +
(4*e*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/(15*d^2*x^3) - (8*e^2*Sqrt[d + e*
x^2]*(a + b*Log[c*x^n]))/(15*d^3*x)
```

3.285. $\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx$

3.285.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

3.285. $\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx$

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.285.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{6}\sqrt{e\,x^{2}+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^6/(e*x^2+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^6/(e*x^2+d)^(1/2),x)
```

3.285.5 Fricas [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 326, normalized size of antiderivative = 1.60

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{6}\sqrt{d+ex^{2}}}\,dx$$
$$= \left[\frac{60\,be^{\frac{5}{2}}nx^{5}\log\left(-2\,ex^{2}-2\,\sqrt{ex^{2}+d}\sqrt{e}x-d\right)-(2\,(47\,be^{2}n+60\,ae^{2})x^{4}+9\,bd^{2}n+45\,ad^{2}-(17\,bden+}{225\,c}\right.$$
$$-\frac{120\,b\sqrt{-e}e^{2}nx^{5}\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^{2}+d}}\right)+(2\,(47\,be^{2}n+60\,ae^{2})x^{4}+9\,bd^{2}n+45\,ad^{2}-(17\,bden+60\,ade)x^{2}+}{225\,d^{3}x^{5}}$$

input
```
integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(1/2),x, algorithm="fricas")
```

output
```
[1/225*(60*b*e^(5/2)*n*x^5*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x - d)
 - (2*(47*b*e^2*n + 60*a*e^2)*x^4 + 9*b*d^2*n + 45*a*d^2 - (17*b*d*e*n + 6
0*a*d*e)*x^2 + 15*(8*b*e^2*x^4 - 4*b*d*e*x^2 + 3*b*d^2)*log(c) + 15*(8*b*e
^2*n*x^4 - 4*b*d*e*n*x^2 + 3*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d^3*x^5),
-1/225*(120*b*sqrt(-e)*e^2*n*x^5*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + (2*(
47*b*e^2*n + 60*a*e^2)*x^4 + 9*b*d^2*n + 45*a*d^2 - (17*b*d*e*n + 60*a*d*e
)*x^2 + 15*(8*b*e^2*x^4 - 4*b*d*e*x^2 + 3*b*d^2)*log(c) + 15*(8*b*e^2*n*x^
4 - 4*b*d*e*n*x^2 + 3*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d^3*x^5)]
```

3.285.6 Sympy [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^6\sqrt{d+ex^2}}\,dx=\int \frac{a+b\log\left(cx^n\right)}{x^6\sqrt{d+ex^2}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**6/(e*x**2+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**6*sqrt(d + e*x**2)), x)
```

3.285.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^n\right)}{x^6\sqrt{d+ex^2}}\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(1/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.285.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^6\sqrt{d+ex^2}}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\sqrt{ex^2+d}x^6}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x^2 + d)*x^6), x)
```

3.285.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^6\sqrt{d+ex^2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^6\,\sqrt{e\,x^2+d}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^6*(d + e*x^2)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^6*(d + e*x^2)^(1/2)), x)
```

3.286 $\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

3.286.1 Optimal result

Integrand size = 25, antiderivative size = 209

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = -\frac{11bd^2n\sqrt{d+ex^2}}{5e^4}+\frac{4bdn(d+ex^2)^{3/2}}{15e^4}-\frac{bn(d+ex^2)^{5/2}}{25e^4}+\frac{16bd^{5/2}n\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{5e^4}+\frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}+\frac{3d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^4}$$

output
```
4/15*b*d*n*(e*x^2+d)^(3/2)/e^4-1/25*b*n*(e*x^2+d)^(5/2)/e^4+16/5*b*d^(5/2)
*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e^4-d*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/
e^4+1/5*(e*x^2+d)^(5/2)*(a+b*ln(c*x^n))/e^4+d^3*(a+b*ln(c*x^n))/e^4/(e*x^2
+d)^(1/2)-11/5*b*d^2*n*(e*x^2+d)^(1/2)/e^4+3*d^2*(a+b*ln(c*x^n))*(e*x^2+d)
^(1/2)/e^4
```

3.286.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 195, normalized size of antiderivative = 0.93

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{240ad^3-148bd^3n+120ad^2ex^2-134bd^2enx^2-30ade^2x^4+11bde^2nx^4+15ae^3}{}$$

input
```
Integrate[(x^7*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
(240*a*d^3 - 148*b*d^3*n + 120*a*d^2*e*x^2 - 134*b*d^2*e*n*x^2 - 30*a*d*e^
2*x^4 + 11*b*d*e^2*n*x^4 + 15*a*e^3*x^6 - 3*b*e^3*n*x^6 - 240*b*d^(5/2)*n*
Sqrt[d + e*x^2]*Log[x] + 15*b*(16*d^3 + 8*d^2*e*x^2 - 2*d*e^2*x^4 + e^3*x^
6)*Log[c*x^n] + 240*b*d^(5/2)*n*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e
*x^2]])/(75*e^4*Sqrt[d + e*x^2])
```

3.286.3 Rubi [A] (verified)

Time = 0.63 (sec) , antiderivative size = 195, normalized size of antiderivative = 0.93, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2792, 27, 2331, 2123, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{e^3x^6-2de^2x^4+8d^2ex^2+16d^3}{5e^4x\sqrt{ex^2+d}}dx+\frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}+\frac{3d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{e^3x^6-2de^2x^4+8d^2ex^2+16d^3}{x\sqrt{ex^2+d}}dx}{5e^4}+\frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}+\frac{3d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \text{2331}$$

$$-\frac{bn\int \frac{e^3x^6-2de^2x^4+8d^2ex^2+16d^3}{x^2\sqrt{ex^2+d}}dx^2}{10e^4}+\frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}+\frac{3d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \textbf{2123}$$

$$-\frac{bn\int \left(\frac{16d^3}{x^2\sqrt{ex^2+d}}+\frac{11ed^2}{\sqrt{ex^2+d}}-4e\sqrt{ex^2+d}d+e(ex^2+d)^{3/2}\right)dx^2}{10e^4}+\frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}+\frac{3d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^4}$$

$$\Big\downarrow \textbf{2009}$$

$$\frac{d^3(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}+\frac{3d^2\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}-\frac{d(d+ex^2)^{3/2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{5/2}(a+b\log(cx^n))}{5e^4}-\frac{bn\left(-32d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+22d^2\sqrt{d+ex^2}-\frac{8}{3}d(d+ex^2)^{3/2}+\frac{2}{5}(d+ex^2)^{5/2}\right)}{10e^4}$$

input
```
Int[(x^7*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
-1/10*(b*n*(22*d^2*Sqrt[d + e*x^2] - (8*d*(d + e*x^2)^(3/2))/3 + (2*(d + e
*x^2)^(5/2))/5 - 32*d^(5/2)*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]))/e^4 + (d^3*
(a + b*Log[c*x^n]))/(e^4*Sqrt[d + e*x^2]) + (3*d^2*Sqrt[d + e*x^2]*(a + b*
Log[c*x^n]))/e^4 - (d*(d + e*x^2)^(3/2)*(a + b*Log[c*x^n]))/e^4 + ((d + e*
x^2)^(5/2)*(a + b*Log[c*x^n]))/(5*e^4)
```

3.286.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2123
```
Int[(Px_)*((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol]
:> Int[ExpandIntegrand[Px*(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c
, d, m, n}, x] && PolyQ[Px, x] && (IntegersQ[m, n] || IGtQ[m, -2])
```

3.286. $\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}dx$

rule 2331
```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/2   S
ubst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x)^p, x], x, x^2], x] /;
 FreeQ[{a, b, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.286.4 Maple [F]

$$\int \frac{x^{7} \left(a +b \ln \left(c \,x^{n}\right)\right)}{\left(e \,x^{2}+d \right)^{\frac{3}{2}}}d x$$

input
```
int(x^7*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
int(x^7*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

3.286.5 Fricas [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 461, normalized size of antiderivative = 2.21

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \left[\frac{120\,(bd^2enx^2+bd^3n)\sqrt{d}\log\left(-\frac{ex^2+2\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(3\,(be^3n-5\,ae^3)x^6+148\cdots}{\cdots}\right.$$
$$-\frac{240\,(bd^2enx^2+bd^3n)\sqrt{-d}\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex^2+d}}\right)+(3\,(be^3n-5\,ae^3)x^6+148\,bd^3n-(11\,bde^2n-30\,ade^2)x^4-\cdots}{\cdots}$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[1/75*(120*(b*d^2*e*n*x^2 + b*d^3*n)*sqrt(d)*log(-(e*x^2 + 2*sqrt(e*x^2 +
d)*sqrt(d) + 2*d)/x^2) - (3*(b*e^3*n - 5*a*e^3)*x^6 + 148*b*d^3*n - (11*b*
d*e^2*n - 30*a*d*e^2)*x^4 - 240*a*d^3 + 2*(67*b*d^2*e*n - 60*a*d^2*e)*x^2
- 15*(b*e^3*x^6 - 2*b*d*e^2*x^4 + 8*b*d^2*e*x^2 + 16*b*d^3)*log(c) - 15*(b
*e^3*n*x^6 - 2*b*d*e^2*n*x^4 + 8*b*d^2*e*n*x^2 + 16*b*d^3*n)*log(x))*sqrt(
e*x^2 + d))/(e^5*x^2 + d*e^4), -1/75*(240*(b*d^2*e*n*x^2 + b*d^3*n)*sqrt(-
d)*arctan(sqrt(-d)/sqrt(e*x^2 + d)) + (3*(b*e^3*n - 5*a*e^3)*x^6 + 148*b*d
^3*n - (11*b*d*e^2*n - 30*a*d*e^2)*x^4 - 240*a*d^3 + 2*(67*b*d^2*e*n - 60*
a*d^2*e)*x^2 - 15*(b*e^3*x^6 - 2*b*d*e^2*x^4 + 8*b*d^2*e*x^2 + 16*b*d^3)*l
og(c) - 15*(b*e^3*n*x^6 - 2*b*d*e^2*n*x^4 + 8*b*d^2*e*n*x^2 + 16*b*d^3*n)*
log(x))*sqrt(e*x^2 + d))/(e^5*x^2 + d*e^4)]
```

3.286.6 Sympy [A] (verification not implemented)

Time = 44.81 (sec) , antiderivative size = 374, normalized size of antiderivative = 1.79

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = a\left(\begin{cases} \frac{d^3}{e^4\sqrt{d+ex^2}} + \frac{3d^2\sqrt{d+ex^2}}{e^4} - \frac{d(d+ex^2)^{\frac{3}{2}}}{e^4} + \frac{(d+ex^2)^{\frac{5}{2}}}{5e^4} & \text{for } e \neq 0 \\ \frac{x^8}{8d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right)$$
$$-bn\left(\begin{cases} -\frac{77d^{\frac{5}{2}}\sqrt{1+\frac{ex^2}{d}}}{75e^4} - \frac{2d^{\frac{5}{2}}\log\left(\frac{ex^2}{d}\right)}{5e^4} + \frac{4d^{\frac{5}{2}}\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{5e^4} - \frac{4d^{\frac{5}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{e^4} - \frac{14d^{\frac{3}{2}}x^2\sqrt{1+\frac{ex^2}{d}}}{75e^3} + \frac{\sqrt{d}x^4\sqrt{1+\frac{ex^2}{d}}}{25e^2} + \ldots \\ \frac{x^8}{64d^{\frac{3}{2}}} \end{cases}\right)$$
$$+b\left(\begin{cases} \frac{d^3}{e^4\sqrt{d+ex^2}} + \frac{3d^2\sqrt{d+ex^2}}{e^4} - \frac{d(d+ex^2)^{\frac{3}{2}}}{e^4} + \frac{(d+ex^2)^{\frac{5}{2}}}{5e^4} & \text{for } e \neq 0 \\ \frac{x^8}{8d^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x**7*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

output
```
a*Piecewise((d**3/(e**4*sqrt(d + e*x**2)) + 3*d**2*sqrt(d + e*x**2)/e**4 -
 d*(d + e*x**2)**(3/2)/e**4 + (d + e*x**2)**(5/2)/(5*e**4), Ne(e, 0)), (x*
*8/(8*d**(3/2)), True)) - b*n*Piecewise((-77*d**(5/2)*sqrt(1 + e*x**2/d)/(
75*e**4) - 2*d**(5/2)*log(e*x**2/d)/(5*e**4) + 4*d**(5/2)*log(sqrt(1 + e*x
**2/d) + 1)/(5*e**4) - 4*d**(5/2)*asinh(sqrt(d)/(sqrt(e)*x))/e**4 - 14*d**
(3/2)*x**2*sqrt(1 + e*x**2/d)/(75*e**3) + sqrt(d)*x**4*sqrt(1 + e*x**2/d)/
(25*e**2) + 3*d**3/(e**(9/2)*x*sqrt(d/(e*x**2) + 1)) + 3*d**2*x/(e**(7/2)*
sqrt(d/(e*x**2) + 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**8/(64*d**(3/2
)), True)) + b*Piecewise((d**3/(e**4*sqrt(d + e*x**2)) + 3*d**2*sqrt(d + e
*x**2)/e**4 - d*(d + e*x**2)**(3/2)/e**4 + (d + e*x**2)**(5/2)/(5*e**4), N
e(e, 0)), (x**8/(8*d**(3/2)), True))*log(c*x**n)
```

3.286.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.286.8 Giac [F]

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^7}{(ex^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^7/(e*x^2 + d)^(3/2), x)
```

3.286.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{x^7\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((x^7*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
```

output
```
int((x^7*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

3.287 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

3.287.1 Optimal result

Integrand size = 25, antiderivative size = 158

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{5bdn\sqrt{d+ex^2}}{3e^3} - \frac{bn(d+ex^2)^{3/2}}{9e^3} - \frac{8bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^3} - \frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}} - \frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3} + \frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

output
```
-1/9*b*n*(e*x^2+d)^(3/2)/e^3-8/3*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1/
2))/e^3+1/3*(e*x^2+d)^(3/2)*(a+b*ln(c*x^n))/e^3-d^2*(a+b*ln(c*x^n))/e^3/(e
*x^2+d)^(1/2)+5/3*b*d*n*(e*x^2+d)^(1/2)/e^3-2*d*(a+b*ln(c*x^n))*(e*x^2+d)^
(1/2)/e^3
```

3.287.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 160, normalized size of antiderivative = 1.01

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{-24ad^2+14bd^2n-12adex^2+13bdenx^2+3ae^2x^4-be^2nx^4+24bd^{3/2}n\sqrt{d+ex^2}}{9e}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
(-24*a*d^2 + 14*b*d^2*n - 12*a*d*e*x^2 + 13*b*d*e*n*x^2 + 3*a*e^2*x^4 - b*
e^2*n*x^4 + 24*b*d^(3/2)*n*Sqrt[d + e*x^2]*Log[x] - 3*b*(8*d^2 + 4*d*e*x^2
 - e^2*x^4)*Log[c*x^n] - 24*b*d^(3/2)*n*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sq
rt[d + e*x^2]])/(9*e^3*Sqrt[d + e*x^2])
```

3.287.3 Rubi [A] (warning: unable to verify)

Time = 0.48 (sec) , antiderivative size = 150, normalized size of antiderivative = 0.95, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.280, Rules used = {2792, 27, 1578, 1192, 25, 1467, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{-e^2x^4+4dex^2+8d^2}{3e^3x\sqrt{ex^2+d}}dx-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{-e^2x^4+4dex^2+8d^2}{x\sqrt{ex^2+d}}dx}{3e^3}-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1578}$$

$$\frac{bn\int \frac{-e^2x^4+4dex^2+8d^2}{x^2\sqrt{ex^2+d}}dx^2}{6e^3}-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \text{1192}$$

$$\frac{bn\int -\frac{-e^2x^8+6de^2x^4+3d^2e^2}{d-x^4}d\sqrt{ex^2+d}}{3e^5}-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \; 25$$

$$-\frac{bn\int \frac{-e^2x^8+6de^2x^4+3d^2e^2}{d-x^4}d\sqrt{ex^2+d}}{3e^5}-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \; 1467$$

$$-\frac{bn\int \left(e^2x^4-5de^2+\frac{8d^2e^2}{d-x^4}\right)d\sqrt{ex^2+d}}{3e^5}-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}$$

$$\Big\downarrow \; 2009$$

$$-\frac{d^2(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^3}+\frac{bn\left(-8d^{3/2}e^2\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+5de^2\sqrt{d+ex^2}-\frac{1}{3}e^2x^6\right)}{3e^5}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
(b*n*(-1/3*(e^2*x^6) + 5*d*e^2*Sqrt[d + e*x^2] - 8*d^(3/2)*e^2*ArcTanh[Sqr
t[d + e*x^2]/Sqrt[d]]))/(3*e^5) - (d^2*(a + b*Log[c*x^n]))/(e^3*Sqrt[d + e
*x^2]) - (2*d*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/e^3 + ((d + e*x^2)^(3/2)
*(a + b*Log[c*x^n]))/(3*e^3)
```

3.287.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1467
```
Int[((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.),
 x_Symbol] :> Int[ExpandIntegrand[(d + e*x^2)^q*(a + b*x^2 + c*x^4)^p, x],
x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e
 + a*e^2, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 1578
```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a
+ b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Int
egerQ[(m - 1)/2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.287.4 Maple [F]

$$\int \frac{x^{5}\left(a+b\ln\left(c\,x^{n}\right)\right)}{\left(e\,x^{2}+d\right)^{\frac{3}{2}}}dx$$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

3.287.5 Fricas [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 356, normalized size of antiderivative = 2.25

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \left[\frac{12\,(bdenx^2+bd^2n)\sqrt{d}\log\left(-\frac{ex^2-2\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-((be^2n-3\,ae^2)x^4-14\,bd^2r\right.$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[1/9*(12*(b*d*e*n*x^2 + b*d^2*n)*sqrt(d)*log(-(e*x^2 - 2*sqrt(e*x^2 + d)*s
qrt(d) + 2*d)/x^2) - ((b*e^2*n - 3*a*e^2)*x^4 - 14*b*d^2*n + 24*a*d^2 - (1
3*b*d*e*n - 12*a*d*e)*x^2 - 3*(b*e^2*x^4 - 4*b*d*e*x^2 - 8*b*d^2)*log(c) -
 3*(b*e^2*n*x^4 - 4*b*d*e*n*x^2 - 8*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(e^4
*x^2 + d*e^3), 1/9*(24*(b*d*e*n*x^2 + b*d^2*n)*sqrt(-d)*arctan(sqrt(-d)/sq
rt(e*x^2 + d)) - ((b*e^2*n - 3*a*e^2)*x^4 - 14*b*d^2*n + 24*a*d^2 - (13*b*
d*e*n - 12*a*d*e)*x^2 - 3*(b*e^2*x^4 - 4*b*d*e*x^2 - 8*b*d^2)*log(c) - 3*(
b*e^2*n*x^4 - 4*b*d*e*n*x^2 - 8*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(e^4*x^2
 + d*e^3)]
```

3.287.6 Sympy [A] (verification not implemented)

Time = 37.36 (sec) , antiderivative size = 308, normalized size of antiderivative = 1.95

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = a\left(\begin{cases} -\frac{d^2}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}}{e^3}+\frac{(d+ex^2)^{\frac{3}{2}}}{3e^3} & \text{for } e\neq 0 \\ \frac{x^6}{6d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)$$

$$-bn\left(\begin{cases}\frac{4d^{\frac{3}{2}}\sqrt{1+\frac{ex^2}{d}}}{9e^3}+\frac{d^{\frac{3}{2}}\log\left(\frac{ex^2}{d}\right)}{6e^3}-\frac{d^{\frac{3}{2}}\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{3e^3}+\frac{3d^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{e^3}+\frac{\sqrt{d}x^2\sqrt{1+\frac{ex^2}{d}}}{9e^2}-\frac{2d^2}{e^{\frac{7}{2}}x\sqrt{\frac{d}{ex^2}+1}}-\frac{2dx}{e^{\frac{5}{2}}\sqrt{\frac{d}{ex^2}+1}} \\ \frac{x^6}{36d^{\frac{3}{2}}}\end{cases}\right.$$

$$+b\left(\begin{cases} -\frac{d^2}{e^3\sqrt{d+ex^2}}-\frac{2d\sqrt{d+ex^2}}{e^3}+\frac{(d+ex^2)^{\frac{3}{2}}}{3e^3} & \text{for } e\neq 0 \\ \frac{x^6}{6d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

output
```
a*Piecewise((-d**2/(e**3*sqrt(d + e*x**2)) - 2*d*sqrt(d + e*x**2)/e**3 + (
d + e*x**2)**(3/2)/(3*e**3), Ne(e, 0)), (x**6/(6*d**(3/2)), True)) - b*n*P
iecewise((4*d**(3/2)*sqrt(1 + e*x**2/d)/(9*e**3) + d**(3/2)*log(e*x**2/d)/
(6*e**3) - d**(3/2)*log(sqrt(1 + e*x**2/d) + 1)/(3*e**3) + 3*d**(3/2)*asin
h(sqrt(d)/(sqrt(e)*x))/e**3 + sqrt(d)*x**2*sqrt(1 + e*x**2/d)/(9*e**2) - 2
*d**2/(e**(7/2)*x*sqrt(d/(e*x**2) + 1)) - 2*d*x/(e**(5/2)*sqrt(d/(e*x**2)
+ 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**6/(36*d**(3/2)), True)) + b*P
iecewise((-d**2/(e**3*sqrt(d + e*x**2)) - 2*d*sqrt(d + e*x**2)/e**3 + (d +
 e*x**2)**(3/2)/(3*e**3), Ne(e, 0)), (x**6/(6*d**(3/2)), True))*log(c*x**n
)
```

3.287.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.287.8 Giac [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/(e*x^2 + d)^(3/2), x)
```

3.287.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx=\int \frac{x^5\,(a+b\,\ln(c\,x^n))}{{(e\,x^2+d)}^{3/2}}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

3.288 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

3.288.1 Optimal result

Integrand size = 25, antiderivative size = 100

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{e^2}+\frac{2b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}$$

output
```
2*b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*d^(1/2)/e^2+d*(a+b*ln(c*x^n))/e^2/(
e*x^2+d)^(1/2)-b*n*(e*x^2+d)^(1/2)/e^2+(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e^2
```

3.288.2 Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.18

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \frac{2ad-bdn+aex^2-benx^2-2b\sqrt{d}n\sqrt{d+ex^2}\log(x)+b(2d+ex^2)\log(cx^n)+2}{e^2\sqrt{d+ex^2}}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
(2*a*d - b*d*n + a*e*x^2 - b*e*n*x^2 - 2*b*Sqrt[d]*n*Sqrt[d + e*x^2]*Log[x
] + b*(2*d + e*x^2)*Log[c*x^n] + 2*b*Sqrt[d]*n*Sqrt[d + e*x^2]*Log[d + Sqr
t[d]*Sqrt[d + e*x^2]])/(e^2*Sqrt[d + e*x^2])
```

3.288.3 Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 100, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.240, Rules used = {2792, 27, 354, 90, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{ex^2+2d}{e^2x\sqrt{ex^2+d}}dx+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{ex^2+2d}{x\sqrt{ex^2+d}}dx}{e^2}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{354}$$

$$-\frac{bn\int \frac{ex^2+2d}{x^2\sqrt{ex^2+d}}dx^2}{2e^2}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{90}$$

$$-\frac{bn\left(2d\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2+2\sqrt{d+ex^2}\right)}{2e^2}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{73}$$

$$-\frac{bn\left(\frac{4d\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}+2\sqrt{d+ex^2}\right)}{2e^2}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{221}$$

$$\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^2}+\frac{d(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}}-\frac{bn\left(2\sqrt{d+ex^2}-4\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\right)}{2e^2}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
-1/2*(b*n*(2*Sqrt[d + e*x^2] - 4*Sqrt[d]*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])
)/e^2 + (d*(a + b*Log[c*x^n]))/(e^2*Sqrt[d + e*x^2]) + (Sqrt[d + e*x^2]*(a
 + b*Log[c*x^n]))/e^2
```

3.288.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.288. $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

3.288.4 Maple [F]

$$\int \frac{x^3(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{3}{2}}}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

3.288.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 245, normalized size of antiderivative = 2.45

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \left[\frac{(benx^2+bdn)\sqrt{d}\log\left(-\frac{ex^2+2\sqrt{ex^2+d}\sqrt{d}+2d}{x^2}\right)-(bdn+(ben-ae)x^2-2ad-(b}{e^3x^2+de^2}\right.$$

$$-\frac{2(benx^2+bdn)\sqrt{-d}\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex^2+d}}\right)+(bdn+(ben-ae)x^2-2ad-(bex^2+2bd)\log(c)-(benx^2+2b}{e^3x^2+de^2}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[((b*e*n*x^2 + b*d*n)*sqrt(d)*log(-(e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(d) + 2*
d)/x^2) - (b*d*n + (b*e*n - a*e)*x^2 - 2*a*d - (b*e*x^2 + 2*b*d)*log(c) -
(b*e*n*x^2 + 2*b*d*n)*log(x))*sqrt(e*x^2 + d))/(e^3*x^2 + d*e^2), -(2*(b*e
*n*x^2 + b*d*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(e*x^2 + d)) + (b*d*n + (b*e*
n - a*e)*x^2 - 2*a*d - (b*e*x^2 + 2*b*d)*log(c) - (b*e*n*x^2 + 2*b*d*n)*lo
g(x))*sqrt(e*x^2 + d))/(e^3*x^2 + d*e^2)]
```

3.288.6 Sympy [A] (verification not implemented)

Time = 24.36 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.67

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = a\left(\begin{cases} \frac{d}{e^2\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}}{e^2} & \text{for } e\neq 0\\ \frac{x^4}{4d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right) - bn\left(\begin{cases} -\frac{2\sqrt{d}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{e^2}+\frac{d}{e^{\frac{5}{2}}x\sqrt{\frac{d}{ex^2}+1}}+\frac{x}{e^{\frac{3}{2}}\sqrt{\frac{d}{ex^2}+1}} & \text{for } e>-\infty\wedge e<\infty\wedge e\neq 0\\ \frac{x^4}{16d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right) + b\left(\begin{cases} \frac{d}{e^2\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}}{e^2} & \text{for } e\neq 0\\ \frac{x^4}{4d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

output
```
a*Piecewise((d/(e**2*sqrt(d + e*x**2)) + sqrt(d + e*x**2)/e**2, Ne(e, 0)),
 (x**4/(4*d**(3/2)), True)) - b*n*Piecewise((-2*sqrt(d)*asinh(sqrt(d)/(sqr
t(e)*x))/e**2 + d/(e**(5/2)*x*sqrt(d/(e*x**2) + 1)) + x/(e**(3/2)*sqrt(d/(
e*x**2) + 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**4/(16*d**(3/2)), True
)) + b*Piecewise((d/(e**2*sqrt(d + e*x**2)) + sqrt(d + e*x**2)/e**2, Ne(e,
 0)), (x**4/(4*d**(3/2)), True))*log(c*x**n)
```

3.288.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.288.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^2 + d)^(3/2), x)
```

3.288.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

3.289 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

3.289.1 Optimal result

Integrand size = 23, antiderivative size = 57

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = -\frac{bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{\sqrt{d}e} - \frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}$$

output
```
-b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/e/d^(1/2)+(-a-b*ln(c*x^n))/e/(e*x^2+
d)^(1/2)
```

3.289.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 77, normalized size of antiderivative = 1.35

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = -\frac{\frac{a}{\sqrt{d+ex^2}} - \frac{bn\log(x)}{\sqrt{d}} + \frac{b\log(cx^n)}{\sqrt{d+ex^2}} + \frac{bn\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{\sqrt{d}}}{e}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
-((a/Sqrt[d + e*x^2] - (b*n*Log[x])/Sqrt[d] + (b*Log[c*x^n])/Sqrt[d + e*x^
2] + (b*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/Sqrt[d])/e)
```

3.289.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2776, 243, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}dx$$

$$\Big\downarrow \text{ 2776}$$

$$\frac{bn\int \frac{1}{x\sqrt{ex^2+d}}dx}{e}-\frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 243}$$

$$\frac{bn\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2}{2e}-\frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 73}$$

$$\frac{bn\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e^2}-\frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 221}$$

$$-\frac{a+b\log(cx^n)}{e\sqrt{d+ex^2}}-\frac{bn\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{\sqrt{d}e}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
-((b*n*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(Sqrt[d]*e)) - (a + b*Log[c*x^n])
/(e*Sqrt[d + e*x^2])
```

3.289.3.1 Defintions of rubi rules used

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

3.289.4 Maple [F]

$$\int \frac{x(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{3}{2}}}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

3.289.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 169, normalized size of antiderivative = 2.96

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \left[\frac{(benx^2+bdn)\sqrt{d}\log\left(-\frac{ex^2-2\sqrt{ex^2+d}\sqrt{d}+2d}{x^2}\right)-2\left(bdn\log(x)+bd\log(c)+ad\right)\sqrt{}}{2\left(de^2x^2+d^2e\right)}\right.$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[1/2*((b*e*n*x^2 + b*d*n)*sqrt(d)*log(-(e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(d)
+ 2*d)/x^2) - 2*(b*d*n*log(x) + b*d*log(c) + a*d)*sqrt(e*x^2 + d))/(d*e^2*
x^2 + d^2*e), ((b*e*n*x^2 + b*d*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(e*x^2 + d
)) - (b*d*n*log(x) + b*d*log(c) + a*d)*sqrt(e*x^2 + d))/(d*e^2*x^2 + d^2*e
)]
```

3.289.6 Sympy [A] (verification not implemented)

Time = 4.63 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.65

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = a\left(\begin{cases}-\frac{1}{e\sqrt{d+ex^2}} & \text{for } e\neq 0\\ \frac{x^2}{2d^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right) - bn\left(\begin{cases}\frac{x^2}{4d^{\frac{3}{2}}} & \text{for } e=0\\ \frac{\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{\sqrt{d}e} & \text{otherwise}\end{cases}\right) + b\left(\begin{cases}\frac{x^2}{2d^{\frac{3}{2}}} & \text{for } e=0\\ -\frac{1}{e\sqrt{d+ex^2}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

output
```
a*Piecewise((-1/(e*sqrt(d + e*x**2)), Ne(e, 0)), (x**2/(2*d**(3/2)), True)
) - b*n*Piecewise((x**2/(4*d**(3/2)), Eq(e, 0)), (asinh(sqrt(d)/(sqrt(e)*x
))/(sqrt(d)*e), True)) + b*Piecewise((x**2/(2*d**(3/2)), Eq(e, 0)), (-1/(e
*sqrt(d + e*x**2)), True))*log(c*x**n)
```

3.289.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.289.8 Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{(b\log(cx^n)+a)x}{(ex^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^2 + d)^(3/2), x)
```

3.289.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

3.290 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx$

3.290.1 Optimal result

Integrand size = 25, antiderivative size = 209

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx = \frac{bn\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}} + \frac{bn\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{3/2}} + \left(\frac{1}{d\sqrt{d+ex^2}} - \frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)(a+b\log(cx^n)) - \frac{bn\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{d^{3/2}} - \frac{bn\,\text{PolyLog}\left(\right.}{}$$

output
```
b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(3/2)+1/2*b*n*arctanh((e*x^2+d)^(1/
2)/d^(1/2))^2/d^(3/2)-b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d
^(1/2)-(e*x^2+d)^(1/2)))/d^(3/2)-1/2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(e
*x^2+d)^(1/2)))/d^(3/2)+(a+b*ln(c*x^n))*(-arctanh((e*x^2+d)^(1/2)/d^(1/2))
/d^(3/2)+1/d/(e*x^2+d)^(1/2))
```

3.290.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.26 (sec) , antiderivative size = 241, normalized size of antiderivative = 1.15

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx = \frac{-bd^{3/2}n\sqrt{1+\frac{d}{ex^2}}\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{d}{ex^2}\right) + 9ex^2\left(-b\sqrt{e}n\sqrt{1+\frac{d}{ex^2}}\,x\,\text{arcsinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)\text{lo}\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)^(3/2)),x]
```

output
```
(-(b*d^(3/2)*n*Sqrt[1 + d/(e*x^2)]*HypergeometricPFQ[{3/2, 3/2, 3/2}, {5/2
, 5/2}, -(d/(e*x^2))]) + 9*e*x^2*(-(b*Sqrt[e]*n*Sqrt[1 + d/(e*x^2)]*x*ArcS
inh[Sqrt[d]/(Sqrt[e]*x)]*Log[x]) - b*n*Sqrt[d + e*x^2]*Log[x]^2 + Sqrt[d +
 e*x^2]*Log[x]*(a + b*Log[c*x^n] + b*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]]) +
 (a + b*Log[c*x^n])*(Sqrt[d] - Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e*
x^2]])))/(9*d^(3/2)*e*x^2*Sqrt[d + e*x^2])
```

3.290.3 Rubi [A] (verified)

Time = 0.60 (sec) , antiderivative size = 206, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx$$

$$\Big\downarrow \text{2790}$$

$$\left(\frac{1}{d\sqrt{d+ex^2}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)(a+b\log(cx^n))-bn\int\left(\frac{1}{dx\sqrt{ex^2+d}}-\frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d^{3/2}x}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\left(\frac{1}{d\sqrt{d+ex^2}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)(a+b\log(cx^n))-bn\left(-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{3/2}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}+\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{d^{3/2}}+\frac{\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^2}}\right.}{2d^{3/2}}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)^(3/2)),x]
```

output
```
(1/(d*Sqrt[d + e*x^2]) - ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]/d^(3/2))*(a + b*
Log[c*x^n]) - b*n*(-(ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]/d^(3/2)) - ArcTanh[S
qrt[d + e*x^2]/Sqrt[d]]^2/(2*d^(3/2)) + (ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*
Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/d^(3/2) + PolyLog[2, 1 - (2*
Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])]/(2*d^(3/2)))
```

3.290.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

3.290.4 Maple [F]

$$\int \frac{a+b\ln(c\,x^{n})}{x\,(e\,x^{2}+d)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^(3/2),x)
```

3.290.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x\,(d+ex^2)^{3/2}}\,dx=\int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e^2*x^5 + 2*d
*e*x^3 + d^2*x), x)
```

3.290.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx = \int \frac{a+b\log(cx^n)}{x(d+ex^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*(d + e*x**2)**(3/2)), x)
```

3.290.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.290.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(3/2)*x), x)
```

3.290.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^{3/2}}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(e\,x^2+d\right)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^(3/2)), x)
```

3.291 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx$

3.291.1 Optimal result

Integrand size = 25, antiderivative size = 287

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx &= -\frac{bn\sqrt{d+ex^2}}{4d^2x^2}-\frac{5ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{5/2}}\\ &\quad-\frac{3ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{5/2}}-\frac{3e(a+b\log(cx^n))}{2d^2\sqrt{d+ex^2}}\\ &\quad-\frac{a+b\log(cx^n)}{2dx^2\sqrt{d+ex^2}}+\frac{3e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{5/2}}\\ &\quad+\frac{3ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2d^{5/2}}+\frac{3ben\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{4d^{5/2}}\end{aligned}$$

output
```
-5/4*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(5/2)-3/4*b*e*n*arctanh((e*x
^2+d)^(1/2)/d^(1/2))^2/d^(5/2)+3/2*e*arctanh((e*x^2+d)^(1/2)/d^(1/2))*(a+b
*ln(c*x^n))/d^(5/2)+3/2*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2
)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(5/2)+3/4*b*e*n*polylog(2,1-2*d^(1/2)/(d^(1
/2)-(e*x^2+d)^(1/2)))/d^(5/2)-3/2*e*(a+b*ln(c*x^n))/d^2/(e*x^2+d)^(1/2)+1/
2*(-a-b*ln(c*x^n))/d/x^2/(e*x^2+d)^(1/2)-1/4*b*n*(e*x^2+d)^(1/2)/d^2/x^2
```

3.291.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.21 (sec) , antiderivative size = 218, normalized size of antiderivative = 0.76

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx = \frac{3bd^{5/2}n\sqrt{1+\frac{d}{ex^2}}\,{}_3F_2\left(\frac{5}{2},\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{d}{ex^2}\right)-5bd^{5/2}n\sqrt{1+\frac{d}{ex^2}}\,\text{Hypergeometric2F1}\left(\frac{3}{2}\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^(3/2)),x]
```

output
```
(3*b*d^(5/2)*n*Sqrt[1 + d/(e*x^2)]*HypergeometricPFQ[{5/2, 5/2, 5/2}, {7/2
, 7/2}, -(d/(e*x^2))] - 5*b*d^(5/2)*n*Sqrt[1 + d/(e*x^2)]*Hypergeometric2F
1[3/2, 5/2, 7/2, -(d/(e*x^2))]*(1 + 2*Log[x]) - 25*e*x^2*(a - b*n*Log[x] +
 b*Log[c*x^n])*(Sqrt[d]*(d + 3*e*x^2) + 3*e*x^2*Sqrt[d + e*x^2]*Log[x] - 3
*e*x^2*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e*x^2]]))/(50*d^(5/2)*e*x^
4*Sqrt[d + e*x^2])
```

3.291.3 Rubi [A] (verified)

Time = 0.67 (sec) , antiderivative size = 282, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.080$, Rules used = {2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int\left(\frac{3\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{2d^{5/2}x}-\frac{3ex^2+d}{2d^2x^3\sqrt{ex^2+d}}\right)dx+\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{5/2}}-\frac{3e(a+b\log(cx^n))}{2d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{2dx^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{2009}$$

$$\frac{3e\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{5/2}}-\frac{3e(a+b\log(cx^n))}{2d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{2dx^2\sqrt{d+ex^2}}-$$
$$bn\left(\frac{3e\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{5/2}}+\frac{5e\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{4d^{5/2}}-\frac{3e\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2d^{5/2}}-\frac{3e\,\mathrm{PolyLog}\left(2,1-\right.}{4d^{5/2}}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^(3/2)),x]
```

output
```
(-3*e*(a + b*Log[c*x^n]))/(2*d^2*Sqrt[d + e*x^2]) - (a + b*Log[c*x^n])/(2*
d*x^2*Sqrt[d + e*x^2]) + (3*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*(a + b*Log[
c*x^n]))/(2*d^(5/2)) - b*n*(Sqrt[d + e*x^2]/(4*d^2*x^2) + (5*e*ArcTanh[Sqr
t[d + e*x^2]/Sqrt[d]])/(4*d^(5/2)) + (3*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]
^2)/(4*d^(5/2)) - (3*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*Log[(2*Sqrt[d])/(S
qrt[d] - Sqrt[d + e*x^2])])/(2*d^(5/2)) - (3*e*PolyLog[2, 1 - (2*Sqrt[d])/
(Sqrt[d] - Sqrt[d + e*x^2])])/(4*d^(5/2)))
```

3.291.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.291.4 Maple [F]

$$\int \frac{a+b\ln(c\,x^n)}{x^3\left(e\,x^2+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(3/2),x)
```

3.291.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{3}{2}}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e^2*x^7 + 2*d
*e*x^5 + d^2*x^3), x)
```

3.291.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx = \int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**3*(d + e*x**2)**(3/2)), x)
```

3.291.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.291.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)^{3/2}}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^{\frac{3}{2}}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(3/2)*x^3), x)
```

3.291.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^2\right)^{3/2}}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\left(e\,x^2+d\right)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(3/2)), x)
```

3.292 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx$

3.292.1 Optimal result

Integrand size = 25, antiderivative size = 328

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx &= \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}\sqrt{d+ex^2}} \\ &+ \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{2e^{3/2}\sqrt{d+ex^2}} \\ &- \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{e^{3/2}\sqrt{d+ex^2}} \\ &- \frac{x(a+b\log(cx^n))}{e\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}\sqrt{d+ex^2}} \\ &- \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{3/2}\sqrt{d+ex^2}}\end{aligned}$$

output
```
-x*(a+b*ln(c*x^n))/e/(e*x^2+d)^(1/2)+b*n*arcsinh(x*e^(1/2)/d^(1/2))*d^(1/2
)*(1+e*x^2/d)^(1/2)/e^(3/2)/(e*x^2+d)^(1/2)+1/2*b*n*arcsinh(x*e^(1/2)/d^(1
/2))^2*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(3/2)/(e*x^2+d)^(1/2)-b*n*arcsinh(x*e^(
1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*d^(1/2)*(1+e*x
^2/d)^(1/2)/e^(3/2)/(e*x^2+d)^(1/2)+arcsinh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x
^n))*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(3/2)/(e*x^2+d)^(1/2)-1/2*b*n*polylog(2,(
x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(3/2)/
(e*x^2+d)^(1/2)
```

3.292.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.32 (sec) , antiderivative size = 217, normalized size of antiderivative = 0.66

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx =$$

$$-\frac{bn\sqrt{1+\frac{ex^2}{d}}\left(e^{3/2}x^3(d+ex^2)\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{ex^2}{d}\right)+9d^2\sqrt{e}x\sqrt{1+\frac{ex^2}{d}}\log(x)-9d^{3/2}(d+ex^2)\,\text{arcsinh}}{9de^{3/2}\,(d+ex^2)^{3/2}}$$

$$-\frac{x(a-bn\log(x)+b\log(cx^n))}{e\sqrt{d+ex^2}}+\frac{(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{e^{3/2}}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
-1/9*(b*n*Sqrt[1 + (e*x^2)/d]*(e^(3/2)*x^3*(d + e*x^2)*HypergeometricPFQ[{
3/2, 3/2, 3/2}, {5/2, 5/2}, -((e*x^2)/d)] + 9*d^2*Sqrt[e]*x*Sqrt[1 + (e*x^
2)/d]*Log[x] - 9*d^(3/2)*(d + e*x^2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[x]))
/(d*e^(3/2)*(d + e*x^2)^(3/2)) - (x*(a - b*n*Log[x] + b*Log[c*x^n]))/(e*Sq
rt[d + e*x^2]) + ((a - b*n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d
 + e*x^2]])/e^(3/2)
```

3.292.3 Rubi [A] (verified)

Time = 0.73 (sec) , antiderivative size = 232, normalized size of antiderivative = 0.71, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2786, 2792, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}dx$$

$$\Big\downarrow \text{ 2786}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\int \frac{x^2(a+b\log(cx^n))}{\left(\frac{ex^2}{d}+1\right)^{3/2}}dx}{d\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 2792}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-bn\int -\frac{\frac{dx}{e\sqrt{\frac{ex^2}{d}+1}}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}}}{x}dx+\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}}-\frac{dx(a+b\log(cx^n))}{e\sqrt{\frac{ex^2}{d}+1}}\right)}{d\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 25}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(bn\int \frac{\frac{dx}{e\sqrt{\frac{ex^2}{d}+1}}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}}}{x}dx+\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}}-\frac{dx(a+b\log(cx^n))}{e\sqrt{\frac{ex^2}{d}+1}}\right)}{d\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(bn\int \left(\frac{d^2\sqrt{\frac{ex^2}{d}+1}}{e(ex^2+d)}-\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{3/2}x}\right)dx+\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}}-\frac{dx(a+b\log(cx^n))}{e\sqrt{\frac{ex^2}{d}+1}}\right)}{d\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{3/2}}-\frac{dx(a+b\log(cx^n))}{e\sqrt{\frac{ex^2}{d}+1}}+bn\left(-\frac{d^{3/2}\,\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{3/2}}+\frac{d^{3/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right.}{2e^{3/2}}\right.\right.}{d\sqrt{d+ex^2}}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^(3/2),x]
```

output
```
(Sqrt[1 + (e*x^2)/d]*(-((d*x*(a + b*Log[c*x^n]))/(e*Sqrt[1 + (e*x^2)/d]))
+ (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/e^(3/2) + b*n*
((d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/e^(3/2) + (d^(3/2)*ArcSinh[(Sqrt[e
]*x)/Sqrt[d]]^2)/(2*e^(3/2)) - (d^(3/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1
 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/e^(3/2) - (d^(3/2)*PolyLog[2, E^(2
*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*e^(3/2)))))/(d*Sqrt[d + e*x^2])
```

3.292.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.292.4 Maple [F]

$$\int \frac{x^2(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{3}{2}}}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

3.292.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*x^2*log(c*x^n) + sqrt(e*x^2 + d)*a*x^2)/(e^2*x
^4 + 2*d*e*x^2 + d^2), x)
```

3.292.6 Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2)**(3/2), x)
```

3.292.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.292.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^2+d)^{\frac{3}{2}}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^2 + d)^(3/2), x)
```

3.292.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{3/2}}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(3/2), x)
```

3.293 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx$

3.293.1 Optimal result

Integrand size = 22, antiderivative size = 58

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx = -\frac{bn\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{d\sqrt{e}}+\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}$$

output
```
-b*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d/e^(1/2)+x*(a+b*ln(c*x^n))/d/(e*x
^2+d)^(1/2)
```

3.293.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 70, normalized size of antiderivative = 1.21

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx = \frac{\frac{ax}{\sqrt{d+ex^2}}+\frac{bx\log(cx^n)}{\sqrt{d+ex^2}}-\frac{bn\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{\sqrt{e}}}{d}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^2)^(3/2),x]
```

output
```
((a*x)/Sqrt[d + e*x^2] + (b*x*Log[c*x^n])/Sqrt[d + e*x^2] - (b*n*Log[e*x +
 Sqrt[e]*Sqrt[d + e*x^2]])/Sqrt[e])/d
```

3.293.3 Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 58, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.136, Rules used = {2751, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{3/2}}\,dx$$

$$\Big\downarrow \text{2751}$$

$$\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}-\frac{bn\int \frac{1}{\sqrt{ex^2+d}}dx}{d}$$

$$\Big\downarrow \text{224}$$

$$\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}-\frac{bn\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}}{d}$$

$$\Big\downarrow \text{219}$$

$$\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}-\frac{bn\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{d\sqrt{e}}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^2)^(3/2),x]
```

output
```
-((b*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(d*Sqrt[e])) + (x*(a + b*Log[
c*x^n]))/(d*Sqrt[d + e*x^2])
```

3.293.3.1 Defintions of rubi rules used

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] && !GtQ[a, 0]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

3.293.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\left(e\,x^{2}+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/(e*x^2+d)^(3/2),x)
```

3.293.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 172, normalized size of antiderivative = 2.97

$$\int \frac{a+b\log\left(cx^{n}\right)}{\left(d+ex^{2}\right)^{3/2}}\,dx = \left[\frac{\left(benx^{2}+bdn\right)\sqrt{e}\log\left(-2\,ex^{2}+2\,\sqrt{ex^{2}+d}\sqrt{e}x-d\right)+2\left(benx\log\left(x\right)+bex\log\left(c\right.\right.}{2\left(de^{2}x^{2}+d^{2}e\right)}\right.$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[1/2*((b*e*n*x^2 + b*d*n)*sqrt(e)*log(-2*e*x^2 + 2*sqrt(e*x^2 + d)*sqrt(e)
*x - d) + 2*(b*e*n*x*log(x) + b*e*x*log(c) + a*e*x)*sqrt(e*x^2 + d))/(d*e^
2*x^2 + d^2*e), ((b*e*n*x^2 + b*d*n)*sqrt(-e)*arctan(sqrt(-e)*x/sqrt(e*x^2
 + d)) + (b*e*n*x*log(x) + b*e*x*log(c) + a*e*x)*sqrt(e*x^2 + d))/(d*e^2*x
^2 + d^2*e)]
```

3.293.6 Sympy [F]

$$\int \frac{a + b\log\left(cx^n\right)}{\left(d + ex^2\right)^{3/2}}\,dx = \int \frac{a + b\log\left(cx^n\right)}{\left(d + ex^2\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**2)**(3/2), x)
```

3.293.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log\left(cx^n\right)}{\left(d + ex^2\right)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.293.8 Giac [F]

$$\int \frac{a + b\log\left(cx^n\right)}{\left(d + ex^2\right)^{3/2}}\,dx = \int \frac{b\log\left(cx^n\right) + a}{\left(ex^2 + d\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^2 + d)^(3/2), x)
```

3.293.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^{3/2}}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{{\left(e\,x^2+d\right)}^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^2)^(3/2),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^2)^(3/2), x)
```

3.294 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx$

3.294.1 Optimal result

Integrand size = 25, antiderivative size = 110

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{d^2x}+\frac{2b\sqrt{e}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{d^2} - \frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}$$

output
```
2*b*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))*e^(1/2)/d^2+(-a-b*ln(c*x^n))/d/x/
(e*x^2+d)^(1/2)-2*e*x*(a+b*ln(c*x^n))/d^2/(e*x^2+d)^(1/2)-b*n*(e*x^2+d)^(1
/2)/d^2/x
```

3.294.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 103, normalized size of antiderivative = 0.94

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx = \frac{-ad-bdn-2aex^2-benx^2-b(d+2ex^2)\log(cx^n)+2b\sqrt{e}nx\sqrt{d+ex^2}\log\left(ex+\sqrt{\right.}}{d^2x\sqrt{d+ex^2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^(3/2)),x]
```

output
```
(-(a*d) - b*d*n - 2*a*e*x^2 - b*e*n*x^2 - b*(d + 2*e*x^2)*Log[c*x^n] + 2*b
*Sqrt[e]*n*x*Sqrt[d + e*x^2]*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(d^2*x*Sq
rt[d + e*x^2])
```

3.294.3 Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 107, normalized size of antiderivative = 0.97, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.240, Rules used = {2792, 25, 27, 358, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int -\frac{2ex^2+d}{d^2x^2\sqrt{ex^2+d}}dx-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 25}$$

$$bn\int \frac{2ex^2+d}{d^2x^2\sqrt{ex^2+d}}dx-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{bn\int \frac{2ex^2+d}{x^2\sqrt{ex^2+d}}dx}{d^2}-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 358}$$

$$\frac{bn\left(2e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{\sqrt{d+ex^2}}{x}\right)}{d^2}-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 224}$$

$$\frac{bn\left(2e\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{\sqrt{d+ex^2}}{x}\right)}{d^2}-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{ 219}$$

$$-\frac{2ex(a+b\log(cx^n))}{d^2\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{dx\sqrt{d+ex^2}}+\frac{bn\left(2\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{\sqrt{d+ex^2}}{x}\right)}{d^2}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^(3/2)),x]
```

output
```
(b*n*(-(Sqrt[d + e*x^2]/x) + 2*Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]
]))/d^2 - (a + b*Log[c*x^n])/(d*x*Sqrt[d + e*x^2]) - (2*e*x*(a + b*Log[c*x
^n]))/(d^2*Sqrt[d + e*x^2])
```

3.294.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.294. $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx$

3.294.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{2}\left(e\,x^{2}+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(3/2),x)
```

3.294.5 Fricas [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 241, normalized size of antiderivative = 2.19

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{2}\left(d+ex^{2}\right)^{3/2}}\,dx = \left[\frac{(benx^{3}+bdnx)\sqrt{e}\log\left(-2\,ex^{2}-2\,\sqrt{ex^{2}+d}\sqrt{e}x-d\right)-(bdn+(ben+2\,ae)x^{2}+}{d^{2}ex^{3}+d^{3}x}\right.$$

$$-\frac{2\,(benx^{3}+bdnx)\sqrt{-e}\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^{2}+d}}\right)+(bdn+(ben+2\,ae)x^{2}+ad+(2\,bex^{2}+bd)\log\left(c\right)+(2\,benx^{2}+}{d^{2}ex^{3}+d^{3}x}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[((b*e*n*x^3 + b*d*n*x)*sqrt(e)*log(-2*e*x^2 - 2*sqrt(e*x^2 + d)*sqrt(e)*x
 - d) - (b*d*n + (b*e*n + 2*a*e)*x^2 + a*d + (2*b*e*x^2 + b*d)*log(c) + (2
*b*e*n*x^2 + b*d*n)*log(x))*sqrt(e*x^2 + d))/(d^2*e*x^3 + d^3*x), -(2*(b*e
*n*x^3 + b*d*n*x)*sqrt(-e)*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + (b*d*n + (
b*e*n + 2*a*e)*x^2 + a*d + (2*b*e*x^2 + b*d)*log(c) + (2*b*e*n*x^2 + b*d*n
)*log(x))*sqrt(e*x^2 + d))/(d^2*e*x^3 + d^3*x)]
```

3.294.6 Sympy [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{2}\left(d+ex^{2}\right)^{3/2}}\,dx = \int \frac{a+b\log\left(cx^{n}\right)}{x^{2}\left(d+ex^{2}\right)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*(d + e*x**2)**(3/2)), x)
```

3.294.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.294.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{3}{2}}x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(3/2)*x^2), x)
```

3.294.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{3/2}}\,dx = \int \frac{a+b\ln(c\,x^n)}{x^2\,(e\,x^2+d)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(3/2)), x)
```

3.295 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx$

3.295.1 Optimal result

Integrand size = 25, antiderivative size = 176

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{9d^2x^3}+\frac{14ben\sqrt{d+ex^2}}{9d^3x}-\frac{8be^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3d^3} - \frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}$$

output
```
-8/3*b*e^(3/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d^3+1/3*(-a-b*ln(c*x^n
))/d/x^3/(e*x^2+d)^(1/2)+4/3*e*(a+b*ln(c*x^n))/d^2/x/(e*x^2+d)^(1/2)+8/3*e
^2*x*(a+b*ln(c*x^n))/d^3/(e*x^2+d)^(1/2)-1/9*b*n*(e*x^2+d)^(1/2)/d^2/x^3+1
4/9*b*e*n*(e*x^2+d)^(1/2)/d^3/x
```

3.295.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 144, normalized size of antiderivative = 0.82

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx = \frac{-3ad^2-bd^2n+12adex^2+13bdenx^2+24ae^2x^4+14be^2nx^4-3b(d^2-4dex^2-8e^2}{9d^3x^3\sqrt{d+ex^2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^(3/2)),x]
```

output
```
(-3*a*d^2 - b*d^2*n + 12*a*d*e*x^2 + 13*b*d*e*n*x^2 + 24*a*e^2*x^4 + 14*b*
e^2*n*x^4 - 3*b*(d^2 - 4*d*e*x^2 - 8*e^2*x^4)*Log[c*x^n] - 24*b*e^(3/2)*n*
x^3*Sqrt[d + e*x^2]*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(9*d^3*x^3*Sqrt[d
+ e*x^2])
```

3.295.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 173, normalized size of antiderivative = 0.98, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.280, Rules used = {2792, 27, 1588, 27, 358, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}dx$$

$$\Big\downarrow \ 2792$$

$$-bn\int -\frac{-8e^2x^4-4dex^2+d^2}{3d^3x^4\sqrt{ex^2+d}}dx+\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 27$$

$$\frac{bn\int \frac{-8e^2x^4-4dex^2+d^2}{x^4\sqrt{ex^2+d}}dx}{3d^3}+\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 1588$$

$$\frac{bn\left(-\frac{\int \frac{2de\left(12ex^2+7d\right)}{x^2\sqrt{ex^2+d}}dx}{3d}-\frac{d\sqrt{d+ex^2}}{3x^3}\right)}{3d^3}+\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 27$$

$$\frac{bn\left(-\frac{2}{3}e\int \frac{12ex^2+7d}{x^2\sqrt{ex^2+d}}dx-\frac{d\sqrt{d+ex^2}}{3x^3}\right)}{3d^3}+\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}$$

$$\Big\downarrow \ 358$$

$$\frac{bn\left(-\frac{2}{3}e\left(12e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{7\sqrt{d+ex^2}}{x}\right)-\frac{d\sqrt{d+ex^2}}{3x^3}\right)}{3d^3}+\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}$$

$$\Big\downarrow 224$$

$$\frac{bn\left(-\frac{2}{3}e\left(12e\int\frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{7\sqrt{d+ex^2}}{x}\right)-\frac{d\sqrt{d+ex^2}}{3x^3}\right)}{3d^3}+\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}$$

$$\Big\downarrow 219$$

$$\frac{8e^2x(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}+\frac{4e(a+b\log(cx^n))}{3d^2x\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{3dx^3\sqrt{d+ex^2}}+\frac{bn\left(-\frac{2}{3}e\left(12\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{7\sqrt{d+ex^2}}{x}\right)-\frac{d\sqrt{d+ex^2}}{3x^3}\right)}{3d^3}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^(3/2)),x]
```

output
```
(b*n*(-1/3*(d*Sqrt[d + e*x^2])/x^3 - (2*e*((-7*Sqrt[d + e*x^2])/x + 12*Sqr
t[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]))/3))/(3*d^3) - (a + b*Log[c*x^n
])/(3*d*x^3*Sqrt[d + e*x^2]) + (4*e*(a + b*Log[c*x^n]))/(3*d^2*x*Sqrt[d +
e*x^2]) + (8*e^2*x*(a + b*Log[c*x^n]))/(3*d^3*Sqrt[d + e*x^2])
```

3.295.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.295.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{4}\left(e\,x^{2}+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(3/2),x)
```

3.295.5 Fricas [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 370, normalized size of antiderivative = 2.10

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx = \left[\frac{12\,(be^2nx^5+bdenx^3)\sqrt{e}\log\left(-2\,ex^2+2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)+(2\,(7\,be^2n+12\,ae^2)\right.$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[1/9*(12*(b*e^2*n*x^5 + b*d*e*n*x^3)*sqrt(e)*log(-2*e*x^2 + 2*sqrt(e*x^2 +
 d)*sqrt(e)*x - d) + (2*(7*b*e^2*n + 12*a*e^2)*x^4 - b*d^2*n - 3*a*d^2 + (
13*b*d*e*n + 12*a*d*e)*x^2 + 3*(8*b*e^2*x^4 + 4*b*d*e*x^2 - b*d^2)*log(c)
+ 3*(8*b*e^2*n*x^4 + 4*b*d*e*n*x^2 - b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d^
3*e*x^5 + d^4*x^3), 1/9*(24*(b*e^2*n*x^5 + b*d*e*n*x^3)*sqrt(-e)*arctan(sq
rt(-e)*x/sqrt(e*x^2 + d)) + (2*(7*b*e^2*n + 12*a*e^2)*x^4 - b*d^2*n - 3*a*
d^2 + (13*b*d*e*n + 12*a*d*e)*x^2 + 3*(8*b*e^2*x^4 + 4*b*d*e*x^2 - b*d^2)*
log(c) + 3*(8*b*e^2*n*x^4 + 4*b*d*e*n*x^2 - b*d^2*n)*log(x))*sqrt(e*x^2 +
d))/(d^3*e*x^5 + d^4*x^3)]
```

3.295.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx = \int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**4*(d + e*x**2)**(3/2)), x)
```

3.295.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{3/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.295.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{3/2}}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^{\frac{3}{2}}x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(3/2)*x^4), x)
```

3.295.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{3/2}}\,dx = \int \frac{a+b\,\ln\left(c\,x^n\right)}{x^4\left(e\,x^2+d\right)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(3/2)), x)
```

3.296 $\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx$

3.296.1 Optimal result

Integrand size = 25, antiderivative size = 236

$$\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx = -\frac{bn\sqrt{d+ex^2}}{25d^2x^5}+\frac{14ben\sqrt{d+ex^2}}{75d^3x^3} - \frac{148be^2n\sqrt{d+ex^2}}{75d^4x}+\frac{16be^{5/2}n\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{5d^4}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}} + \frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}$$

output
```
16/5*b*e^(5/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d^4+1/5*(-a-b*ln(c*x^n
))/d/x^5/(e*x^2+d)^(1/2)+2/5*e*(a+b*ln(c*x^n))/d^2/x^3/(e*x^2+d)^(1/2)-8/5
*e^2*(a+b*ln(c*x^n))/d^3/x/(e*x^2+d)^(1/2)-16/5*e^3*x*(a+b*ln(c*x^n))/d^4/
(e*x^2+d)^(1/2)-1/25*b*n*(e*x^2+d)^(1/2)/d^2/x^5+14/75*b*e*n*(e*x^2+d)^(1/
2)/d^3/x^3-148/75*b*e^2*n*(e*x^2+d)^(1/2)/d^4/x
```

3.296.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 180, normalized size of antiderivative = 0.76

$$\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx = \frac{-15ad^3-3bd^3n+30ad^2ex^2+11bd^2enx^2-120ade^2x^4-134bde^2nx^4-240ae^3x^6-}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^6*(d + e*x^2)^(3/2)),x]
```

output
```
(-15*a*d^3 - 3*b*d^3*n + 30*a*d^2*e*x^2 + 11*b*d^2*e*n*x^2 - 120*a*d*e^2*x
^4 - 134*b*d*e^2*n*x^4 - 240*a*e^3*x^6 - 148*b*e^3*n*x^6 - 15*b*(d^3 - 2*d
^2*e*x^2 + 8*d*e^2*x^4 + 16*e^3*x^6)*Log[c*x^n] + 240*b*e^(5/2)*n*x^5*Sqrt
[d + e*x^2]*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(75*d^4*x^5*Sqrt[d + e*x^2
])
```

3.296.3 Rubi [A] (verified)

Time = 0.60 (sec) , antiderivative size = 242, normalized size of antiderivative = 1.03, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.400$, Rules used = {2792, 27, 2338, 9, 27, 1588, 27, 358, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{16e^3x^6+8de^2x^4-2d^2ex^2+d^3}{5d^4x^6\sqrt{ex^2+d}}dx-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{16e^3x^6+8de^2x^4-2d^2ex^2+d^3}{x^6\sqrt{ex^2+d}}dx}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{2338}$$

$$\frac{bn\left(-\frac{\int \frac{2\left(-40de^3x^5-20d^2e^2x^3+7d^3ex\right)}{x^5\sqrt{ex^2+d}}dx}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$\downarrow$ 9

$$\frac{bn\left(-\frac{\int \frac{2\left(-40de^3x^4-20d^2e^2x^2+7d^3e\right)}{x^4\sqrt{ex^2+d}}dx}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$\downarrow$ 27

$$\frac{bn\left(-\frac{2\int \frac{-40de^3x^4-20d^2e^2x^2+7d^3e}{x^4\sqrt{ex^2+d}}dx}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$\downarrow$ 1588

$$\frac{bn\left(-\frac{2\left(-\frac{\int \frac{2d^2e^2\left(60ex^2+37d\right)}{x^2\sqrt{ex^2+d}}dx}{3d}-\frac{7d^2e\sqrt{d+ex^2}}{3x^3}\right)}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$\downarrow$ 27

$$\frac{bn\left(-\frac{2\left(-\frac{2}{3}de^2\int \frac{60ex^2+37d}{x^2\sqrt{ex^2+d}}dx-\frac{7d^2e\sqrt{d+ex^2}}{3x^3}\right)}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$\downarrow$ 358

3.296. $\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx$

$$\frac{bn\left(-\frac{2\left(-\frac{2}{3}de^2\left(60e\int\frac{1}{\sqrt{ex^2+d}}dx-\frac{37\sqrt{d+ex^2}}{x}\right)-\frac{7d^2e\sqrt{d+ex^2}}{3x^3}\right)}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{224}$$

$$\frac{bn\left(-\frac{2\left(-\frac{2}{3}de^2\left(60e\int\frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{37\sqrt{d+ex^2}}{x}\right)-\frac{7d^2e\sqrt{d+ex^2}}{3x^3}\right)}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{219}$$

$$-\frac{16e^3x(a+b\log(cx^n))}{5d^4\sqrt{d+ex^2}}-\frac{8e^2(a+b\log(cx^n))}{5d^3x\sqrt{d+ex^2}}+\frac{2e(a+b\log(cx^n))}{5d^2x^3\sqrt{d+ex^2}}-\frac{a+b\log(cx^n)}{5dx^5\sqrt{d+ex^2}}+\frac{bn\left(-\frac{2\left(-\frac{2}{3}de^2\left(60\sqrt{e}\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{37\sqrt{d+ex^2}}{x}\right)-\frac{7d^2e\sqrt{d+ex^2}}{3x^3}\right)}{5d}-\frac{d^2\sqrt{d+ex^2}}{5x^5}\right)}{5d^4}$$

input
```
Int[(a + b*Log[c*x^n])/(x^6*(d + e*x^2)^(3/2)),x]
```

output
```
(b*n*(-1/5*(d^2*Sqrt[d + e*x^2])/x^5 - (2*((-7*d^2*e*Sqrt[d + e*x^2])/(3*x
^3) - (2*d*e^2*((-37*Sqrt[d + e*x^2])/x + 60*Sqrt[e]*ArcTanh[(Sqrt[e]*x)/S
qrt[d + e*x^2]]))/3))/(5*d)))/(5*d^4) - (a + b*Log[c*x^n])/(5*d*x^5*Sqrt[d
 + e*x^2]) + (2*e*(a + b*Log[c*x^n]))/(5*d^2*x^3*Sqrt[d + e*x^2]) - (8*e^2
*(a + b*Log[c*x^n]))/(5*d^3*x*Sqrt[d + e*x^2]) - (16*e^3*x*(a + b*Log[c*x^
n]))/(5*d^4*Sqrt[d + e*x^2])
```

3.296.3.1 Defintions of rubi rules used

rule 9
```
Int[(u_.)*(Px_)^(p_.)*((e_.)*(x_))^(m_.), x_Symbol] :> With[{r = Expon[Px,
x, Min]}, Simp[1/e^(p*r)   Int[u*(e*x)^(m + p*r)*ExpandToSum[Px/x^r, x]^p,
x], x] /; IGtQ[r, 0]] /; FreeQ[{e, m}, x] && PolyQ[Px, x] && IntegerQ[p] &&
  !MonomialQ[Px, x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

rule 2338
```
Int[(Pq_)*((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[{
Q = PolynomialQuotient[Pq, c*x, x], R = PolynomialRemainder[Pq, c*x, x]}, S
imp[R*(c*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*c*(m + 1))), x] + Simp[1/(a*c*(
m + 1))   Int[(c*x)^(m + 1)*(a + b*x^2)^p*ExpandToSum[a*c*(m + 1)*Q - b*R*(
m + 2*p + 3)*x, x], x], x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && Lt
Q[m, -1] && (IntegerQ[2*p] || NeQ[Expon[Pq, x], 1])
```

3.296. $\int \frac{a+b\log(cx^n)}{x^6(d+ex^2)^{3/2}}\,dx$

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.296.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{6}\left(e\,x^{2}+d\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^6/(e*x^2+d)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^6/(e*x^2+d)^(3/2),x)
```

3.296.5 Fricas [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 473, normalized size of antiderivative = 2.00

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{6}\left(d+ex^{2}\right)^{3/2}}\,dx = \Bigg[\frac{120\left(be^{3}nx^{7}+bde^{2}nx^{5}\right)\sqrt{e}\log\left(-2\,ex^{2}-2\,\sqrt{ex^{2}+d}\sqrt{e}x-d\right)-\left(4\left(37\,be^{3}n+60\,a\right.\right.}{}$$

$$-\frac{240\left(be^{3}nx^{7}+bde^{2}nx^{5}\right)\sqrt{-e}\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^{2}+d}}\right)+\left(4\left(37\,be^{3}n+60\,ae^{3}\right)x^{6}+3\,bd^{3}n+2\left(67\,bde^{2}n+60\,ade^{2}\right)\right.}{}$$

input
```
integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(3/2),x, algorithm="fricas")
```

output
```
[1/75*(120*(b*e^3*n*x^7 + b*d*e^2*n*x^5)*sqrt(e)*log(-2*e*x^2 - 2*sqrt(e*x
^2 + d)*sqrt(e)*x - d) - (4*(37*b*e^3*n + 60*a*e^3)*x^6 + 3*b*d^3*n + 2*(6
7*b*d*e^2*n + 60*a*d*e^2)*x^4 + 15*a*d^3 - (11*b*d^2*e*n + 30*a*d^2*e)*x^2
 + 15*(16*b*e^3*x^6 + 8*b*d*e^2*x^4 - 2*b*d^2*e*x^2 + b*d^3)*log(c) + 15*(
16*b*e^3*n*x^6 + 8*b*d*e^2*n*x^4 - 2*b*d^2*e*n*x^2 + b*d^3*n)*log(x))*sqrt
(e*x^2 + d))/(d^4*e*x^7 + d^5*x^5), -1/75*(240*(b*e^3*n*x^7 + b*d*e^2*n*x^
5)*sqrt(-e)*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + (4*(37*b*e^3*n + 60*a*e^3
)*x^6 + 3*b*d^3*n + 2*(67*b*d*e^2*n + 60*a*d*e^2)*x^4 + 15*a*d^3 - (11*b*d
^2*e*n + 30*a*d^2*e)*x^2 + 15*(16*b*e^3*x^6 + 8*b*d*e^2*x^4 - 2*b*d^2*e*x^
2 + b*d^3)*log(c) + 15*(16*b*e^3*n*x^6 + 8*b*d*e^2*n*x^4 - 2*b*d^2*e*n*x^2
 + b*d^3*n)*log(x))*sqrt(e*x^2 + d))/(d^4*e*x^7 + d^5*x^5)]
```

3.296.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^6\left(d+ex^2\right)^{3/2}}\,dx=\text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**6/(e*x**2+d)**(3/2),x)
```

output
```
Timed out
```

3.296.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^n\right)}{x^6\left(d+ex^2\right)^{3/2}}\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(3/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.296.8 Giac [F]

$$\int \frac{a + b\log(cx^n)}{x^6(d + ex^2)^{3/2}}\,dx = \int \frac{b\log(cx^n) + a}{(ex^2 + d)^{\frac{3}{2}}x^6}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^6/(e*x^2+d)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(3/2)*x^6), x)
```

3.296.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{x^6(d + ex^2)^{3/2}}\,dx = \int \frac{a + b\,\ln(c\,x^n)}{x^6\,(e\,x^2 + d)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^6*(d + e*x^2)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^6*(d + e*x^2)^(3/2)), x)
```

3.297 $\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

3.297.1 Optimal result

Integrand size = 25, antiderivative size = 212

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = -\frac{bd^2n}{3e^4\sqrt{d+ex^2}}+\frac{8bdn\sqrt{d+ex^2}}{3e^4}-\frac{bn(d+ex^2)^{3/2}}{9e^4} -\frac{16bd^{3/2}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^4}+\frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}}-\frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}} -\frac{3d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^4}$$

output
```
-1/9*b*n*(e*x^2+d)^(3/2)/e^4-16/3*b*d^(3/2)*n*arctanh((e*x^2+d)^(1/2)/d^(1
/2))/e^4+1/3*d^3*(a+b*ln(c*x^n))/e^4/(e*x^2+d)^(3/2)+1/3*(e*x^2+d)^(3/2)*(
a+b*ln(c*x^n))/e^4-1/3*b*d^2*n/e^4/(e*x^2+d)^(1/2)-3*d^2*(a+b*ln(c*x^n))/e
^4/(e*x^2+d)^(1/2)+8/3*b*d*n*(e*x^2+d)^(1/2)/e^4-3*d*(a+b*ln(c*x^n))*(e*x^
2+d)^(1/2)/e^4
```

3.297.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 240, normalized size of antiderivative = 1.13

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{-48ad^3+20bd^3n-72ad^2ex^2+42bd^2enx^2-18ade^2x^4+21bde^2nx^4+3ae^3x^6-}{}$$

input
```
Integrate[(x^7*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(-48*a*d^3 + 20*b*d^3*n - 72*a*d^2*e*x^2 + 42*b*d^2*e*n*x^2 - 18*a*d*e^2*x
^4 + 21*b*d*e^2*n*x^4 + 3*a*e^3*x^6 - b*e^3*n*x^6 + 48*b*d^(3/2)*n*(d + e*
x^2)^(3/2)*Log[x] - 3*b*(16*d^3 + 24*d^2*e*x^2 + 6*d*e^2*x^4 - e^3*x^6)*Lo
g[c*x^n] - 48*b*d^(5/2)*n*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e*x^2]]
 - 48*b*d^(3/2)*e*n*x^2*Sqrt[d + e*x^2]*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/
(9*e^4*(d + e*x^2)^(3/2))
```

3.297.3 Rubi [A] (verified)

Time = 0.67 (sec) , antiderivative size = 196, normalized size of antiderivative = 0.92, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2792, 27, 2331, 2122, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$$

$$\Big\downarrow \ 2792$$

$$-bn\int -\frac{-e^3x^6+6de^2x^4+24d^2ex^2+16d^3}{3e^4x\,(ex^2+d)^{3/2}}dx+\frac{d^3(a+b\log(cx^n))}{3e^4\,(d+ex^2)^{3/2}}-\frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{3e^4}$$

$$\Big\downarrow \ 27$$

$$\frac{bn\int\frac{-e^3x^6+6de^2x^4+24d^2ex^2+16d^3}{x(ex^2+d)^{3/2}}dx}{3e^4}+\frac{d^3(a+b\log(cx^n))}{3e^4\,(d+ex^2)^{3/2}}-\frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{3/2}\,(a+b\log(cx^n))}{3e^4}$$

$$\Big\downarrow \text{2331}$$

$$\frac{bn\int \frac{-e^3x^6+6de^2x^4+24d^2ex^2+16d^3}{x^2(ex^2+d)^{3/2}}dx^2}{6e^4}+\frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}}-\frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^4}$$

$$\Big\downarrow \text{2122}$$

$$\frac{bn\int \left(\frac{16d^2}{x^2\sqrt{ex^2+d}}+\frac{ed^2}{(ex^2+d)^{3/2}}+\frac{7ed}{\sqrt{ex^2+d}}-\frac{e^2x^2}{\sqrt{ex^2+d}}\right)dx^2}{6e^4}+\frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}}-\frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^4}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^3(a+b\log(cx^n))}{3e^4(d+ex^2)^{3/2}}-\frac{3d^2(a+b\log(cx^n))}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}(a+b\log(cx^n))}{e^4}+\frac{(d+ex^2)^{3/2}(a+b\log(cx^n))}{3e^4}+\frac{bn\left(-32d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)-\frac{2d^2}{\sqrt{d+ex^2}}+16d\sqrt{d+ex^2}-\frac{2}{3}(d+ex^2)^{3/2}\right)}{6e^4}$$

input
```
Int[(x^7*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(b*n*((-2*d^2)/Sqrt[d + e*x^2] + 16*d*Sqrt[d + e*x^2] - (2*(d + e*x^2)^(3/
2))/3 - 32*d^(3/2)*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]))/(6*e^4) + (d^3*(a +
b*Log[c*x^n]))/(3*e^4*(d + e*x^2)^(3/2)) - (3*d^2*(a + b*Log[c*x^n]))/(e^4
*Sqrt[d + e*x^2]) - (3*d*Sqrt[d + e*x^2]*(a + b*Log[c*x^n]))/e^4 + ((d + e
*x^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^4)
```

3.297.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.297. $\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

rule 2122
```
Int[((Px_)*((c_.) + (d_.)*(x_))^(n_))/((a_.) + (b_.)*(x_)), x_Symbol] :> In
t[ExpandIntegrand[1/Sqrt[c + d*x], Px*((c + d*x)^(n + 1/2)/(a + b*x)), x],
x] /; FreeQ[{a, b, c, d, n}, x] && PolyQ[Px, x] && ILtQ[n + 1/2, 0]
```

rule 2331
```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[1/2   S
ubst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x)^p, x], x, x^2], x] /;
 FreeQ[{a, b, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.297.4 Maple [F]

$$\int \frac{x^7(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}dx$$

input
```
int(x^7*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x^7*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

3.297.5 Fricas [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 504, normalized size of antiderivative = 2.38

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \left[\frac{24\,(bde^2nx^4+2\,bd^2enx^2+bd^3n)\sqrt{d}\log\left(-\frac{ex^2-2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-((be^3n-3\,ae^3$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/9*(24*(b*d*e^2*n*x^4 + 2*b*d^2*e*n*x^2 + b*d^3*n)*sqrt(d)*log(-(e*x^2 -
 2*sqrt(e*x^2 + d)*sqrt(d) + 2*d)/x^2) - ((b*e^3*n - 3*a*e^3)*x^6 - 20*b*d
^3*n - 3*(7*b*d*e^2*n - 6*a*d*e^2)*x^4 + 48*a*d^3 - 6*(7*b*d^2*e*n - 12*a*
d^2*e)*x^2 - 3*(b*e^3*x^6 - 6*b*d*e^2*x^4 - 24*b*d^2*e*x^2 - 16*b*d^3)*log
(c) - 3*(b*e^3*n*x^6 - 6*b*d*e^2*n*x^4 - 24*b*d^2*e*n*x^2 - 16*b*d^3*n)*lo
g(x))*sqrt(e*x^2 + d))/(e^6*x^4 + 2*d*e^5*x^2 + d^2*e^4), 1/9*(48*(b*d*e^2
*n*x^4 + 2*b*d^2*e*n*x^2 + b*d^3*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(e*x^2 +
d)) - ((b*e^3*n - 3*a*e^3)*x^6 - 20*b*d^3*n - 3*(7*b*d*e^2*n - 6*a*d*e^2)*
x^4 + 48*a*d^3 - 6*(7*b*d^2*e*n - 12*a*d^2*e)*x^2 - 3*(b*e^3*x^6 - 6*b*d*e
^2*x^4 - 24*b*d^2*e*x^2 - 16*b*d^3)*log(c) - 3*(b*e^3*n*x^6 - 6*b*d*e^2*n*
x^4 - 24*b*d^2*e*n*x^2 - 16*b*d^3*n)*log(x))*sqrt(e*x^2 + d))/(e^6*x^4 + 2
*d*e^5*x^2 + d^2*e^4)]
```

3.297.6 Sympy [A] (verification not implemented)

Time = 104.75 (sec) , antiderivative size = 556, normalized size of antiderivative = 2.62

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = a\left(\begin{cases}\frac{d^3}{3e^4(d+ex^2)^{\frac{3}{2}}}-\frac{3d^2}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}}{e^4}+\frac{(d+ex^2)^{\frac{3}{2}}}{3e^4} & \text{for } e\neq 0\\ \frac{x^8}{8d^{\frac{5}{2}}} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases}\frac{4d^{\frac{3}{2}}\sqrt{1+\frac{ex^2}{d}}}{9e^4}+\frac{d^{\frac{3}{2}}\log\left(\frac{ex^2}{d}\right)}{6e^4}-\frac{d^{\frac{3}{2}}\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{3e^4}+\frac{6d^{\frac{3}{2}}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{e^4}+\frac{\sqrt{d}x^2\sqrt{1+\frac{ex^2}{d}}}{9e^3}+\frac{2d^6\sqrt{1+\frac{ex^2}{d}}}{6d^{\frac{9}{2}}e^4+6d^{\frac{7}{2}}e^5x^2}+\frac{d^6\log}{6d^{\frac{9}{2}}e^4+} \\ \frac{x^8}{64d^{\frac{5}{2}}}\end{cases}\right.$$
$$+b\left(\begin{cases}\frac{d^3}{3e^4(d+ex^2)^{\frac{3}{2}}}-\frac{3d^2}{e^4\sqrt{d+ex^2}}-\frac{3d\sqrt{d+ex^2}}{e^4}+\frac{(d+ex^2)^{\frac{3}{2}}}{3e^4} & \text{for } e\neq 0\\ \frac{x^8}{8d^{\frac{5}{2}}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**7*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
a*Piecewise((d**3/(3*e**4*(d + e*x**2)**(3/2)) - 3*d**2/(e**4*sqrt(d + e*x
**2)) - 3*d*sqrt(d + e*x**2)/e**4 + (d + e*x**2)**(3/2)/(3*e**4), Ne(e, 0)
), (x**8/(8*d**(5/2)), True)) - b*n*Piecewise((4*d**(3/2)*sqrt(1 + e*x**2/
d)/(9*e**4) + d**(3/2)*log(e*x**2/d)/(6*e**4) - d**(3/2)*log(sqrt(1 + e*x*
*2/d) + 1)/(3*e**4) + 6*d**(3/2)*asinh(sqrt(d)/(sqrt(e)*x))/e**4 + sqrt(d)
*x**2*sqrt(1 + e*x**2/d)/(9*e**3) + 2*d**6*sqrt(1 + e*x**2/d)/(6*d**(9/2)*
e**4 + 6*d**(7/2)*e**5*x**2) + d**6*log(e*x**2/d)/(6*d**(9/2)*e**4 + 6*d**
(7/2)*e**5*x**2) - 2*d**6*log(sqrt(1 + e*x**2/d) + 1)/(6*d**(9/2)*e**4 + 6
*d**(7/2)*e**5*x**2) + d**5*x**2*log(e*x**2/d)/(6*d**(9/2)*e**3 + 6*d**(7/
2)*e**4*x**2) - 2*d**5*x**2*log(sqrt(1 + e*x**2/d) + 1)/(6*d**(9/2)*e**3 +
 6*d**(7/2)*e**4*x**2) - 3*d**2/(e**(9/2)*x*sqrt(d/(e*x**2) + 1)) - 3*d*x/
(e**(7/2)*sqrt(d/(e*x**2) + 1)), (e > -oo) & (e < oo) & Ne(e, 0)), (x**8/(
64*d**(5/2)), True)) + b*Piecewise((d**3/(3*e**4*(d + e*x**2)**(3/2)) - 3*
d**2/(e**4*sqrt(d + e*x**2)) - 3*d*sqrt(d + e*x**2)/e**4 + (d + e*x**2)**(
3/2)/(3*e**4), Ne(e, 0)), (x**8/(8*d**(5/2)), True))*log(c*x**n)
```

3.297.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.297.8 Giac [F]

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^7}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^7*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^7/(e*x^2 + d)^(5/2), x)
```

3.297.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^7(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{x^7\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((x^7*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x^7*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.298 $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

3.298.1 Optimal result

Integrand size = 25, antiderivative size = 155

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{bdn}{3e^3\sqrt{d+ex^2}}-\frac{bn\sqrt{d+ex^2}}{e^3}+\frac{8b\sqrt{d}n\,\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3e^3} - \frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}$$

output
```
-1/3*d^2*(a+b*ln(c*x^n))/e^3/(e*x^2+d)^(3/2)+8/3*b*n*arctanh((e*x^2+d)^(1/
2)/d^(1/2))*d^(1/2)/e^3+1/3*b*d*n/e^3/(e*x^2+d)^(1/2)+2*d*(a+b*ln(c*x^n))/
e^3/(e*x^2+d)^(1/2)-b*n*(e*x^2+d)^(1/2)/e^3+(a+b*ln(c*x^n))*(e*x^2+d)^(1/2
)/e^3
```

3.298.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 205, normalized size of antiderivative = 1.32

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = -\frac{8b\sqrt{d}n\log(x)}{3e^3}+\frac{bn(8d^2+12dex^2+3e^2x^4)\log(x)}{3e^3(d+ex^2)^{3/2}} + \sqrt{d+ex^2}\left(-\frac{d^2(a+b(-n\log(x)+\log(cx^n)))}{3e^3(d+ex^2)^2}+\frac{a-bn+b(-n\log(x)+\log(cx^n))}{e^3}+\frac{d(6a+bn+6b(-n\log}{3e^3(d+}\right. + \frac{8b\sqrt{d}n\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{3e^3}$$

input
```
Integrate[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(-8*b*Sqrt[d]*n*Log[x])/(3*e^3) + (b*n*(8*d^2 + 12*d*e*x^2 + 3*e^2*x^4)*Lo
g[x])/(3*e^3*(d + e*x^2)^(3/2)) + Sqrt[d + e*x^2]*(-1/3*(d^2*(a + b*(-(n*L
og[x]) + Log[c*x^n])))/(e^3*(d + e*x^2)^2) + (a - b*n + b*(-(n*Log[x]) + L
og[c*x^n]))/e^3 + (d*(6*a + b*n + 6*b*(-(n*Log[x]) + Log[c*x^n])))/(3*e^3*
(d + e*x^2))) + (8*b*Sqrt[d]*n*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(3*e^3)
```

3.298.3 Rubi [A] (warning: unable to verify)

Time = 0.48 (sec) , antiderivative size = 147, normalized size of antiderivative = 0.95, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.240$, Rules used = {2792, 27, 1578, 1192, 1584, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$$

$$\Big\downarrow \text{ 2792}$$

$$-bn\int \frac{3e^2x^4+12dex^2+8d^2}{3e^3x(ex^2+d)^{3/2}}dx-\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}$$

$$\Big\downarrow \text{ 27}$$

$$-\frac{bn\int \frac{3e^2x^4+12dex^2+8d^2}{x(ex^2+d)^{3/2}}dx}{3e^3}-\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}$$

$$\Big\downarrow \text{ 1578}$$

$$-\frac{bn\int \frac{3e^2x^4+12dex^2+8d^2}{x^2(ex^2+d)^{3/2}}dx^2}{6e^3}-\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}$$

$$\Big\downarrow \text{ 1192}$$

$$-\frac{bn\int \frac{-3e^2x^8-6de^2x^4+d^2e^2}{x^4(d-x^4)}d\sqrt{ex^2+d}}{3e^5}-\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}$$

$$\Big\downarrow 1584$$

$$-\frac{bn\int\left(-\frac{8de^2}{d-x^4}+\frac{de^2}{x^4}+3e^2\right)d\sqrt{ex^2+d}}{3e^5}-\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}$$

$$\Big\downarrow 2009$$

$$-\frac{d^2(a+b\log(cx^n))}{3e^3(d+ex^2)^{3/2}}+\frac{2d(a+b\log(cx^n))}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}(a+b\log(cx^n))}{e^3}-\frac{bn\left(-8\sqrt{d}e^2\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)+3e^2\sqrt{d+ex^2}-\frac{de^2}{x^2}\right)}{3e^5}$$

input
```
Int[(x^5*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
-1/3*(b*n*(-((d*e^2)/x^2) + 3*e^2*Sqrt[d + e*x^2] - 8*Sqrt[d]*e^2*ArcTanh[
Sqrt[d + e*x^2]/Sqrt[d]]))/e^5 - (d^2*(a + b*Log[c*x^n]))/(3*e^3*(d + e*x^
2)^(3/2)) + (2*d*(a + b*Log[c*x^n]))/(e^3*Sqrt[d + e*x^2]) + (Sqrt[d + e*x
^2]*(a + b*Log[c*x^n]))/e^3
```

3.298.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1192
```
Int[((d_.) + (e_.)*(x_))^(m_)*((f_.) + (g_.)*(x_))^(n_)*((a_.) + (b_.)*(x_)
 + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Simp[2/e^(n + 2*p + 1)   Subst[Int[x^(
2*m + 1)*(e*f - d*g + g*x^2)^n*(c*d^2 - b*d*e + a*e^2 - (2*c*d - b*e)*x^2 +
 c*x^4)^p, x], x, Sqrt[d + e*x]], x] /; FreeQ[{a, b, c, d, e, f, g}, x] &&
IGtQ[p, 0] && ILtQ[n, 0] && IntegerQ[m + 1/2]
```

rule 1578
```
Int[(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_
)^4)^(p_.), x_Symbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(d + e*x)^q*(a
+ b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x] && Int
egerQ[(m - 1)/2]
```

3.298. $\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

rule 1584
```
Int[((f_.)*(x_))^(m_.)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (
c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(f*x)^m*(d + e*x^2)^q*
(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, q}, x] && NeQ[
b^2 - 4*a*c, 0] && IGtQ[p, 0] && IGtQ[q, -2]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.298.4 Maple [F]

$$\int \frac{x^5(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}dx$$

input
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x^5*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

3.298.5 Fricas [A] (verification not implemented)

Time = 0.36 (sec) , antiderivative size = 401, normalized size of antiderivative = 2.59

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \left[\frac{4\,(be^2nx^4+2\,bdenx^2+bd^2n)\sqrt{d}\log\left(-\frac{ex^2+2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(3\,(be^2n-ae^2)x^4 \cdots}{\cdots}\right.$$
$$-\frac{8\,(be^2nx^4+2\,bdenx^2+bd^2n)\sqrt{-d}\arctan\left(\frac{\sqrt{-d}}{\sqrt{ex^2+d}}\right)+(3\,(be^2n-ae^2)x^4+2\,bd^2n-8\,ad^2+(5\,bden-12\,a \cdots}{3\,(e^5x^4+2\,de^4x^2 \cdots}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/3*(4*(b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(d)*log(-(e*x^2 + 2*sq
rt(e*x^2 + d)*sqrt(d) + 2*d)/x^2) - (3*(b*e^2*n - a*e^2)*x^4 + 2*b*d^2*n -
 8*a*d^2 + (5*b*d*e*n - 12*a*d*e)*x^2 - (3*b*e^2*x^4 + 12*b*d*e*x^2 + 8*b*
d^2)*log(c) - (3*b*e^2*n*x^4 + 12*b*d*e*n*x^2 + 8*b*d^2*n)*log(x))*sqrt(e*
x^2 + d))/(e^5*x^4 + 2*d*e^4*x^2 + d^2*e^3), -1/3*(8*(b*e^2*n*x^4 + 2*b*d*
e*n*x^2 + b*d^2*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(e*x^2 + d)) + (3*(b*e^2*n
 - a*e^2)*x^4 + 2*b*d^2*n - 8*a*d^2 + (5*b*d*e*n - 12*a*d*e)*x^2 - (3*b*e^
2*x^4 + 12*b*d*e*x^2 + 8*b*d^2)*log(c) - (3*b*e^2*n*x^4 + 12*b*d*e*n*x^2 +
 8*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(e^5*x^4 + 2*d*e^4*x^2 + d^2*e^3)]
```

3.298.6 Sympy [A] (verification not implemented)

Time = 65.07 (sec) , antiderivative size = 415, normalized size of antiderivative = 2.68

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = a\left(\begin{cases} -\frac{d^2}{3e^3(d+ex^2)^{\frac{3}{2}}}+\frac{2d}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}}{e^3} & \text{for } e\neq 0 \\ \frac{x^6}{6d^{\frac{5}{2}}} & \text{otherwise} \end{cases}\right)$$

$$-bn\left(\begin{cases} -\frac{3\sqrt{d}\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{e^3}-\frac{2d^5\sqrt{1+\frac{ex^2}{d}}}{6d^{\frac{9}{2}}e^3+6d^{\frac{7}{2}}e^4x^2}-\frac{d^5\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}e^3+6d^{\frac{7}{2}}e^4x^2}+\frac{2d^5\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}e^3+6d^{\frac{7}{2}}e^4x^2}-\frac{d^4x^2\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}e^2+6d^{\frac{7}{2}}e^3x^2}+\frac{2d^4x^2\log\left(\sqrt{1+\right.}{6d^{\frac{9}{2}}e^2+6d^{\frac{7}{2}}e\right.} \\ \frac{x^6}{36d^{\frac{5}{2}}} \end{cases}\right.$$

$$+b\left(\begin{cases} -\frac{d^2}{3e^3(d+ex^2)^{\frac{3}{2}}}+\frac{2d}{e^3\sqrt{d+ex^2}}+\frac{\sqrt{d+ex^2}}{e^3} & \text{for } e\neq 0 \\ \frac{x^6}{6d^{\frac{5}{2}}} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate(x**5*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
a*Piecewise((-d**2/(3*e**3*(d + e*x**2)**(3/2)) + 2*d/(e**3*sqrt(d + e*x**
2)) + sqrt(d + e*x**2)/e**3, Ne(e, 0)), (x**6/(6*d**(5/2)), True)) - b*n*P
iecewise((-3*sqrt(d)*asinh(sqrt(d)/(sqrt(e)*x))/e**3 - 2*d**5*sqrt(1 + e*x
**2/d)/(6*d**(9/2)*e**3 + 6*d**(7/2)*e**4*x**2) - d**5*log(e*x**2/d)/(6*d*
*(9/2)*e**3 + 6*d**(7/2)*e**4*x**2) + 2*d**5*log(sqrt(1 + e*x**2/d) + 1)/(
6*d**(9/2)*e**3 + 6*d**(7/2)*e**4*x**2) - d**4*x**2*log(e*x**2/d)/(6*d**(9
/2)*e**2 + 6*d**(7/2)*e**3*x**2) + 2*d**4*x**2*log(sqrt(1 + e*x**2/d) + 1)
/(6*d**(9/2)*e**2 + 6*d**(7/2)*e**3*x**2) + d/(e**(7/2)*x*sqrt(d/(e*x**2)
+ 1)) + x/(e**(5/2)*sqrt(d/(e*x**2) + 1)), (e > -oo) & (e < oo) & Ne(e, 0)
), (x**6/(36*d**(5/2)), True)) + b*Piecewise((-d**2/(3*e**3*(d + e*x**2)**
(3/2)) + 2*d/(e**3*sqrt(d + e*x**2)) + sqrt(d + e*x**2)/e**3, Ne(e, 0)), (
x**6/(6*d**(5/2)), True))*log(c*x**n)
```

3.298.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.298.8 Giac [F]

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^5}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^5*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^5/(e*x^2 + d)^(5/2), x)
```

3.298.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^5(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{x^5\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x^5*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.299 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

3.299.1 Optimal result

Integrand size = 25, antiderivative size = 108

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = -\frac{bn}{3e^2\sqrt{d+ex^2}} - \frac{2bn\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3\sqrt{d}e^2} + \frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}} - \frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}$$

output
```
1/3*d*(a+b*ln(c*x^n))/e^2/(e*x^2+d)^(3/2)-2/3*b*n*arctanh((e*x^2+d)^(1/2)/
d^(1/2))/e^2/d^(1/2)-1/3*b*n/e^2/(e*x^2+d)^(1/2)+(-a-b*ln(c*x^n))/e^2/(e*x
^2+d)^(1/2)
```

3.299.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.27

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{\frac{2bn\log(x)}{\sqrt{d}} - \frac{bn(2d+3ex^2)\log(x)}{(d+ex^2)^{3/2}} + \frac{d(a-bn\log(x)+b\log(cx^n))-(d+ex^2)(3a+bn-3bn\log(x)+3b\log(cx^n)}{(d+ex^2)^{3/2}}}{3e^2}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
((2*b*n*Log[x])/Sqrt[d] - (b*n*(2*d + 3*e*x^2)*Log[x])/(d + e*x^2)^(3/2) +
 (d*(a - b*n*Log[x] + b*Log[c*x^n]) - (d + e*x^2)*(3*a + b*n - 3*b*n*Log[x
] + 3*b*Log[c*x^n]))/(d + e*x^2)^(3/2) - (2*b*n*Log[d + Sqrt[d]*Sqrt[d + e
*x^2]])/Sqrt[d])/(3*e^2)
```

3.299.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 104, normalized size of antiderivative = 0.96, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.240, Rules used = {2792, 27, 354, 87, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{3ex^2+2d}{3e^2x\left(ex^2+d\right)^{3/2}}dx-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}+\frac{d(a+b\log(cx^n))}{3e^2\left(d+ex^2\right)^{3/2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{3ex^2+2d}{x\left(ex^2+d\right)^{3/2}}dx}{3e^2}-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}+\frac{d(a+b\log(cx^n))}{3e^2\left(d+ex^2\right)^{3/2}}$$

$$\Big\downarrow \text{354}$$

$$\frac{bn\int \frac{3ex^2+2d}{x^2\left(ex^2+d\right)^{3/2}}dx^2}{6e^2}-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}+\frac{d(a+b\log(cx^n))}{3e^2\left(d+ex^2\right)^{3/2}}$$

$$\Big\downarrow \text{87}$$

$$\frac{bn\left(2\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2-\frac{2}{\sqrt{d+ex^2}}\right)}{6e^2}-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}+\frac{d(a+b\log(cx^n))}{3e^2\left(d+ex^2\right)^{3/2}}$$

$$\Big\downarrow \text{73}$$

$$\frac{bn\left(\frac{4\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{e}-\frac{2}{\sqrt{d+ex^2}}\right)}{6e^2}-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}+\frac{d(a+b\log(cx^n))}{3e^2\left(d+ex^2\right)^{3/2}}$$

$$\Big\downarrow \text{221}$$

$$-\frac{a+b\log(cx^n)}{e^2\sqrt{d+ex^2}}+\frac{d(a+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}}+\frac{bn\left(-\frac{4\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{\sqrt{d}}-\frac{2}{\sqrt{d+ex^2}}\right)}{6e^2}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(b*n*(-2/Sqrt[d + e*x^2] - (4*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/Sqrt[d]))/
(6*e^2) + (d*(a + b*Log[c*x^n]))/(3*e^2*(d + e*x^2)^(3/2)) - (a + b*Log[c*
x^n])/(e^2*Sqrt[d + e*x^2])
```

3.299.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 87
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[(-(b*e - a*f))*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(f*(p
+ 1)*(c*f - d*e))), x] - Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p
+ 1)))/(f*(p + 1)*(c*f - d*e))   Int[(c + d*x)^n*(e + f*x)^(p + 1), x], x]
/; FreeQ[{a, b, c, d, e, f, n}, x] && LtQ[p, -1] && ( !LtQ[n, -1] || Intege
rQ[p] ||  !(IntegerQ[n] ||  !(EqQ[e, 0] ||  !(EqQ[c, 0] || LtQ[p, n]))))
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

3.299. $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.299.4 Maple [F]

$$\int \frac{x^3(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

3.299.5 Fricas [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 325, normalized size of antiderivative = 3.01

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \left[\frac{(be^2nx^4+2\,bdenx^2+bd^2n)\sqrt{d}\log\left(-\frac{ex^2-2\,\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)-(bd^2n+2\,ad^2+(b\cdots}{3\,(de^4x^4+2\cdots}\right.$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/3*((b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(d)*log(-(e*x^2 - 2*sqrt
(e*x^2 + d)*sqrt(d) + 2*d)/x^2) - (b*d^2*n + 2*a*d^2 + (b*d*e*n + 3*a*d*e)
*x^2 + (3*b*d*e*x^2 + 2*b*d^2)*log(c) + (3*b*d*e*n*x^2 + 2*b*d^2*n)*log(x)
)*sqrt(e*x^2 + d))/(d*e^4*x^4 + 2*d^2*e^3*x^2 + d^3*e^2), 1/3*(2*(b*e^2*n*
x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(-d)*arctan(sqrt(-d)/sqrt(e*x^2 + d)) -
 (b*d^2*n + 2*a*d^2 + (b*d*e*n + 3*a*d*e)*x^2 + (3*b*d*e*x^2 + 2*b*d^2)*lo
g(c) + (3*b*d*e*n*x^2 + 2*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d*e^4*x^4 + 2
*d^2*e^3*x^2 + d^3*e^2)]
```

3.299.6 Sympy [A] (verification not implemented)

Time = 28.71 (sec) , antiderivative size = 337, normalized size of antiderivative = 3.12

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = a\left(\begin{cases}\frac{d}{3e^2(d+ex^2)^{\frac{3}{2}}}-\frac{1}{e^2\sqrt{d+ex^2}} & \text{for } e\neq 0\\ \frac{x^4}{4d^{\frac{5}{2}}} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases}\frac{2d^4\sqrt{1+\frac{ex^2}{d}}}{6d^{\frac{9}{2}}e^2+6d^{\frac{7}{2}}e^3x^2}+\frac{d^4\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}e^2+6d^{\frac{7}{2}}e^3x^2}-\frac{2d^4\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}e^2+6d^{\frac{7}{2}}e^3x^2}+\frac{d^3x^2\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2}-\frac{2d^3x^2\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2}+\frac{\operatorname{asinh}\left(\frac{\sqrt{d}}{\sqrt{e}x}\right)}{\sqrt{d}e^2}\\ \frac{x^4}{16d^{\frac{5}{2}}}\end{cases}\right.$$
$$+b\left(\begin{cases}\frac{d}{3e^2(d+ex^2)^{\frac{3}{2}}}-\frac{1}{e^2\sqrt{d+ex^2}} & \text{for } e\neq 0\\ \frac{x^4}{4d^{\frac{5}{2}}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
a*Piecewise((d/(3*e**2*(d + e*x**2)**(3/2)) - 1/(e**2*sqrt(d + e*x**2)), N
e(e, 0)), (x**4/(4*d**(5/2)), True)) - b*n*Piecewise((2*d**4*sqrt(1 + e*x*
*2/d)/(6*d**(9/2)*e**2 + 6*d**(7/2)*e**3*x**2) + d**4*log(e*x**2/d)/(6*d**
(9/2)*e**2 + 6*d**(7/2)*e**3*x**2) - 2*d**4*log(sqrt(1 + e*x**2/d) + 1)/(6
*d**(9/2)*e**2 + 6*d**(7/2)*e**3*x**2) + d**3*x**2*log(e*x**2/d)/(6*d**(9/
2)*e + 6*d**(7/2)*e**2*x**2) - 2*d**3*x**2*log(sqrt(1 + e*x**2/d) + 1)/(6*
d**(9/2)*e + 6*d**(7/2)*e**2*x**2) + asinh(sqrt(d)/(sqrt(e)*x))/(sqrt(d)*e
**2), (e > -oo) & (e < oo) & Ne(e, 0)), (x**4/(16*d**(5/2)), True)) + b*Pi
ecewise((d/(3*e**2*(d + e*x**2)**(3/2)) - 1/(e**2*sqrt(d + e*x**2)), Ne(e,
 0)), (x**4/(4*d**(5/2)), True))*log(c*x**n)
```

3.299.7 Maxima [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.27

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{1}{3}bn\left(\frac{\log\left(\frac{\sqrt{ex^2+d}-\sqrt{d}}{\sqrt{ex^2+d}+\sqrt{d}}\right)}{\sqrt{d}e^2}-\frac{1}{\sqrt{ex^2+d}e^2}\right)$$
$$-\frac{1}{3}b\left(\frac{3x^2}{(ex^2+d)^{\frac{3}{2}}e}+\frac{2d}{(ex^2+d)^{\frac{3}{2}}e^2}\right)\log(cx^n)-\frac{1}{3}a\left(\frac{3x^2}{(ex^2+d)^{\frac{3}{2}}e}+\frac{2d}{(ex^2+d)^{\frac{3}{2}}e^2}\right)$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
1/3*b*n*(log((sqrt(e*x^2 + d) - sqrt(d))/(sqrt(e*x^2 + d) + sqrt(d)))/(sqr
t(d)*e^2) - 1/(sqrt(e*x^2 + d)*e^2)) - 1/3*b*(3*x^2/((e*x^2 + d)^(3/2)*e)
+ 2*d/((e*x^2 + d)^(3/2)*e^2))*log(c*x^n) - 1/3*a*(3*x^2/((e*x^2 + d)^(3/2
)*e) + 2*d/((e*x^2 + d)^(3/2)*e^2))
```

3.299.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^2 + d)^(5/2), x)
```

3.299.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.300 $\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

3.300.1 Optimal result

Integrand size = 23, antiderivative size = 84

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx=\frac{bn}{3de\sqrt{d+ex^2}}-\frac{bn\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{3/2}e}-\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}$$

output
```
-1/3*b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(3/2)/e+1/3*(-a-b*ln(c*x^n))/e
/(e*x^2+d)^(3/2)+1/3*b*n/d/e/(e*x^2+d)^(1/2)
```

3.300.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.15

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx=-\frac{\frac{a}{(d+ex^2)^{3/2}}-\frac{bn}{d\sqrt{d+ex^2}}-\frac{bn\log(x)}{d^{3/2}}+\frac{b\log(cx^n)}{(d+ex^2)^{3/2}}+\frac{bn\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{d^{3/2}}}{3e}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
-1/3*(a/(d + e*x^2)^(3/2) - (b*n)/(d*Sqrt[d + e*x^2]) - (b*n*Log[x])/d^(3/
2) + (b*Log[c*x^n])/(d + e*x^2)^(3/2) + (b*n*Log[d + Sqrt[d]*Sqrt[d + e*x^
2]])/d^(3/2))/e
```

3.300.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 80, normalized size of antiderivative = 0.95, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2776, 243, 61, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$$

$$\Big\downarrow \ 2776$$

$$\frac{bn\int \frac{1}{x(ex^2+d)^{3/2}}dx}{3e}-\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}$$

$$\Big\downarrow \ 243$$

$$\frac{bn\int \frac{1}{x^2(ex^2+d)^{3/2}}dx^2}{6e}-\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}$$

$$\Big\downarrow \ 61$$

$$\frac{bn\left(\frac{\int \frac{1}{x^2\sqrt{ex^2+d}}dx^2}{d}+\frac{2}{d\sqrt{d+ex^2}}\right)}{6e}-\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}$$

$$\Big\downarrow \ 73$$

$$\frac{bn\left(\frac{2\int \frac{1}{\frac{x^4}{e}-\frac{d}{e}}d\sqrt{ex^2+d}}{de}+\frac{2}{d\sqrt{d+ex^2}}\right)}{6e}-\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}$$

$$\Big\downarrow \ 221$$

$$\frac{bn\left(\frac{2}{d\sqrt{d+ex^2}}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{3/2}}\right)}{6e}-\frac{a+b\log(cx^n)}{3e(d+ex^2)^{3/2}}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(b*n*(2/(d*Sqrt[d + e*x^2]) - (2*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/d^(3/2)
))/(6*e) - (a + b*Log[c*x^n])/(3*e*(d + e*x^2)^(3/2))
```

3.300.3.1 Defintions of rubi rules used

rule 61
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^(n + 1)/((b*c - a*d)*(m + 1))), x] - Simp[d*((
m + n + 2)/((b*c - a*d)*(m + 1)))   Int[(a + b*x)^(m + 1)*(c + d*x)^n, x],
x] /; FreeQ[{a, b, c, d, n}, x] && LtQ[m, -1] &&  !(LtQ[n, -1] && (EqQ[a, 0
] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && IntLinearQ[a, b, c, d
, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

3.300.4 Maple [F]

$$\int \frac{x(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

3.300.5 Fricas [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 267, normalized size of antiderivative = 3.18

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \left[\frac{(be^2nx^4+2\,bdenx^2+bd^2n)\sqrt{d}\log\left(-\frac{ex^2-2\sqrt{ex^2+d}\sqrt{d}+2\,d}{x^2}\right)+2\,(bdenx^2-bd^2n\,\mathrm{lo}}{6\,(d^2e^3x^4+2\,d^3e^2x^2+d^4e)}\right.$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/6*((b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(d)*log(-(e*x^2 - 2*sqrt
(e*x^2 + d)*sqrt(d) + 2*d)/x^2) + 2*(b*d*e*n*x^2 - b*d^2*n*log(x) + b*d^2*
n - b*d^2*log(c) - a*d^2)*sqrt(e*x^2 + d))/(d^2*e^3*x^4 + 2*d^3*e^2*x^2 +
d^4*e), 1/3*((b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(-d)*arctan(sqrt(
-d)/sqrt(e*x^2 + d)) + (b*d*e*n*x^2 - b*d^2*n*log(x) + b*d^2*n - b*d^2*log
(c) - a*d^2)*sqrt(e*x^2 + d))/(d^2*e^3*x^4 + 2*d^3*e^2*x^2 + d^4*e)]
```

3.300.6 Sympy [A] (verification not implemented)

Time = 13.69 (sec) , antiderivative size = 272, normalized size of antiderivative = 3.24

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = a\left(\begin{cases}-\frac{1}{3e(d+ex^2)^{\frac{3}{2}}} & \text{for } e\neq 0\\ \frac{x^2}{2d^{\frac{5}{2}}} & \text{otherwise}\end{cases}\right)$$
$$-bn\left(\begin{cases}-\frac{2d^3\sqrt{1+\frac{ex^2}{d}}}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2}-\frac{d^3\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2}+\frac{2d^3\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}e+6d^{\frac{7}{2}}e^2x^2}-\frac{d^2x^2\log\left(\frac{ex^2}{d}\right)}{6d^{\frac{9}{2}}+6d^{\frac{7}{2}}ex^2}+\frac{2d^2x^2\log\left(\sqrt{1+\frac{ex^2}{d}}+1\right)}{6d^{\frac{9}{2}}+6d^{\frac{7}{2}}ex^2} & \text{for } e>-\mathrm{c}\\ \frac{x^2}{4d^{\frac{5}{2}}} & \text{otherwise}\end{cases}\right.$$
$$+b\left(\begin{cases}-\frac{1}{3e(d+ex^2)^{\frac{3}{2}}} & \text{for } e\neq 0\\ \frac{x^2}{2d^{\frac{5}{2}}} & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate(x*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
a*Piecewise((-1/(3*e*(d + e*x**2)**(3/2)), Ne(e, 0)), (x**2/(2*d**(5/2)),
True)) - b*n*Piecewise((-2*d**3*sqrt(1 + e*x**2/d)/(6*d**(9/2)*e + 6*d**(7
/2)*e**2*x**2) - d**3*log(e*x**2/d)/(6*d**(9/2)*e + 6*d**(7/2)*e**2*x**2)
+ 2*d**3*log(sqrt(1 + e*x**2/d) + 1)/(6*d**(9/2)*e + 6*d**(7/2)*e**2*x**2)
 - d**2*x**2*log(e*x**2/d)/(6*d**(9/2) + 6*d**(7/2)*e*x**2) + 2*d**2*x**2*
log(sqrt(1 + e*x**2/d) + 1)/(6*d**(9/2) + 6*d**(7/2)*e*x**2), (e > -oo) &
(e < oo) & Ne(e, 0)), (x**2/(4*d**(5/2)), True)) + b*Piecewise((-1/(3*e*(d
 + e*x**2)**(3/2)), Ne(e, 0)), (x**2/(2*d**(5/2)), True))*log(c*x**n)
```

3.300.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.300.8 Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^2 + d)^(5/2), x)
```

3.300.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.301 $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{5/2}}\,dx$

3.301.1 Optimal result

Integrand size = 25, antiderivative size = 251

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{5/2}}\,dx = -\frac{bn}{3d^2\sqrt{d+ex^2}}+\frac{4bn\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{5/2}}+\frac{bn\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{5/2}}$$
$$+\frac{1}{3}\left(\frac{1}{d(d+ex^2)^{3/2}}+\frac{3}{d^2\sqrt{d+ex^2}}-\frac{3\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{5/2}}\right)(a+b\log(cx^n))-\frac{bn\,\mathrm{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+\ldots}}\right.}{d^{5/2}}$$

output
```
4/3*b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(5/2)+1/2*b*n*arctanh((e*x^2+d)
^(1/2)/d^(1/2))^2/d^(5/2)-b*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))*ln(2*d^(1/2
)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(5/2)-1/2*b*n*polylog(2,1-2*d^(1/2)/(d^(1/2
)-(e*x^2+d)^(1/2)))/d^(5/2)+1/3*(a+b*ln(c*x^n))*(1/d/(e*x^2+d)^(3/2)-3*arc
tanh((e*x^2+d)^(1/2)/d^(1/2))/d^(5/2)+3/d^2/(e*x^2+d)^(1/2))-1/3*b*n/d^2/(
e*x^2+d)^(1/2)
```

3.301.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.31 (sec) , antiderivative size = 273, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{5/2}}\,dx = \frac{bn\sqrt{1+\frac{d}{ex^2}}\left(-3d^{5/2}(d+ex^2)^2\,{}_3F_2\left(\frac{5}{2},\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{d}{ex^2}\right)+25\sqrt{d}e^3\sqrt{1+\frac{d}{ex^2}}x^6(4d+3\right.}{75d^{5/2}e^2x^4(d+ex^2)^{5/2}}$$
$$+\frac{(4d+3ex^2)(a-bn\log(x)+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}+\frac{\log(x)(a-bn\log(x)+b\log(cx^n))}{d^{5/2}}$$
$$-\frac{(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{d^{5/2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^2)^(5/2)),x]
```

output
```
(b*n*Sqrt[1 + d/(e*x^2)]*(-3*d^(5/2)*(d + e*x^2)^2*HypergeometricPFQ[{5/2,
 5/2, 5/2}, {7/2, 7/2}, -(d/(e*x^2))] + 25*Sqrt[d]*e^3*Sqrt[1 + d/(e*x^2)]
*x^6*(4*d + 3*e*x^2)*Log[x] - 75*e^(5/2)*x^5*(d + e*x^2)^2*ArcSinh[Sqrt[d]
/(Sqrt[e]*x)]*Log[x]))/(75*d^(5/2)*e^2*x^4*(d + e*x^2)^(5/2)) + ((4*d + 3*
e*x^2)*(a - b*n*Log[x] + b*Log[c*x^n]))/(3*d^2*(d + e*x^2)^(3/2)) + (Log[x
]*(a - b*n*Log[x] + b*Log[c*x^n]))/d^(5/2) - ((a - b*n*Log[x] + b*Log[c*x^
n])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/d^(5/2)
```

3.301.3 Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 245, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{5/2}}\,dx$$

$$\Big\downarrow \ 2790$$

$$\frac{1}{3}\left(-\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{5/2}}+\frac{3}{d^2\sqrt{d+ex^2}}+\frac{1}{d(d+ex^2)^{3/2}}\right)(a+b\log(cx^n))-$$
$$bn\int\left(-\frac{\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{d^{5/2}x}+\frac{1}{d^2x\sqrt{ex^2+d}}+\frac{1}{3dx(ex^2+d)^{3/2}}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{1}{3}\left(-\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{d^{5/2}}+\frac{3}{d^2\sqrt{d+ex^2}}+\frac{1}{d(d+ex^2)^{3/2}}\right)(a+b\log(cx^n))-$$
$$bn\left(-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{2d^{5/2}}-\frac{4\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{3d^{5/2}}+\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{d^{5/2}}+\frac{\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex}}\right.}{2d^{5/2}}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^2)^(5/2)),x]
```

output
```
((1/(d*(d + e*x^2)^(3/2)) + 3/(d^2*Sqrt[d + e*x^2]) - (3*ArcTanh[Sqrt[d +
e*x^2]/Sqrt[d]])/d^(5/2))*(a + b*Log[c*x^n]))/3 - b*n*(1/(3*d^2*Sqrt[d + e
*x^2]) - (4*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(3*d^(5/2)) - ArcTanh[Sqrt[d
 + e*x^2]/Sqrt[d]]^2/(2*d^(5/2)) + (ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*Log[(
2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/d^(5/2) + PolyLog[2, 1 - (2*Sqrt[
d])/(Sqrt[d] - Sqrt[d + e*x^2])]/(2*d^(5/2)))
```

3.301.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

3.301. $\int \frac{a+b\log(cx^n)}{x(d+ex^2)^{5/2}}\,dx$

3.301.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\left(e\,x^{2}+d\right)^{\frac{5}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^(5/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(e*x^2+d)^(5/2),x)
```

3.301.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{2}\right)^{5/2}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex^{2}+d\right)^{\frac{5}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e^3*x^7 + 3*d
*e^2*x^5 + 3*d^2*e*x^3 + d^3*x), x)
```

3.301.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{2}\right)^{5/2}}\,dx=\text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x/(e*x**2+d)**(5/2),x)
```

output
```
Timed out
```

3.301.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.301.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^{5/2}}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^{\frac{5}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(5/2)*x), x)
```

3.301.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^2\right)^{5/2}}\,dx = \int \frac{a+b\,\ln\left(c\,x^n\right)}{x\left(e\,x^2+d\right)^{5/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^(5/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^2)^(5/2)), x)
```

3.302 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx$

3.302.1 Optimal result

Integrand size = 25, antiderivative size = 337

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx = \frac{ben}{3d^3\sqrt{d+ex^2}} - \frac{bn\sqrt{d+ex^2}}{4d^3x^2} - \frac{31ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{12d^{7/2}} - \frac{5ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{7/2}} - \frac{5e(a+b\log(cx^n))}{6d^2(d+ex^2)^{3/2}} - \frac{a+b\log(cx^n)}{2dx^2(d+ex^2)^{3/2}} - \frac{5e(a+b\log(cx^n))}{2d^3\sqrt{d+ex^2}} + \frac{5e\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{7/2}} + \frac{5ben\operatorname{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2d^{7/2}} + \frac{5ben\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{4d^{7/2}}$$

output
```
-31/12*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2))/d^(7/2)-5/4*b*e*n*arctanh((e
*x^2+d)^(1/2)/d^(1/2))^2/d^(7/2)-5/6*e*(a+b*ln(c*x^n))/d^2/(e*x^2+d)^(3/2)
+1/2*(-a-b*ln(c*x^n))/d/x^2/(e*x^2+d)^(3/2)+5/2*e*arctanh((e*x^2+d)^(1/2)/
d^(1/2))*(a+b*ln(c*x^n))/d^(7/2)+5/2*b*e*n*arctanh((e*x^2+d)^(1/2)/d^(1/2)
)*ln(2*d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(7/2)+5/4*b*e*n*polylog(2,1-2*
d^(1/2)/(d^(1/2)-(e*x^2+d)^(1/2)))/d^(7/2)+1/3*b*e*n/d^3/(e*x^2+d)^(1/2)-5
/2*e*(a+b*ln(c*x^n))/d^3/(e*x^2+d)^(1/2)-1/4*b*n*(e*x^2+d)^(1/2)/d^3/x^2
```

3.302.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.19 (sec) , antiderivative size = 227, normalized size of antiderivative = 0.67

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx = \frac{bn\sqrt{1+\frac{d}{ex^2}}\left(5\,{}_3F_2\left(\frac{7}{2},\frac{7}{2},\frac{7}{2};\frac{9}{2},\frac{9}{2};-\frac{d}{ex^2}\right)-7\,\text{Hypergeometric2F1}\left(\frac{5}{2},\frac{7}{2},\frac{9}{2},-\frac{d}{ex^2}\right)(1+2}{98e^2x^6\sqrt{d+ex^2}}$$
$$-\frac{(3d^2+20dex^2+15e^2x^4)(a-bn\log(x)+b\log(cx^n))}{6d^3x^2(d+ex^2)^{3/2}}$$
$$-\frac{5e\log(x)(a-bn\log(x)+b\log(cx^n))}{2d^{7/2}}$$
$$+\frac{5e(a-bn\log(x)+b\log(cx^n))\log\left(d+\sqrt{d}\sqrt{d+ex^2}\right)}{2d^{7/2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^(5/2)),x]
```

output
```
(b*n*Sqrt[1 + d/(e*x^2)]*(5*HypergeometricPFQ[{7/2, 7/2, 7/2}, {9/2, 9/2},
 -(d/(e*x^2))] - 7*Hypergeometric2F1[5/2, 7/2, 9/2, -(d/(e*x^2))]*(1 + 2*L
og[x])))/(98*e^2*x^6*Sqrt[d + e*x^2]) - ((3*d^2 + 20*d*e*x^2 + 15*e^2*x^4)
*(a - b*n*Log[x] + b*Log[c*x^n]))/(6*d^3*x^2*(d + e*x^2)^(3/2)) - (5*e*Log
[x]*(a - b*n*Log[x] + b*Log[c*x^n]))/(2*d^(7/2)) + (5*e*(a - b*n*Log[x] +
b*Log[c*x^n])*Log[d + Sqrt[d]*Sqrt[d + e*x^2]])/(2*d^(7/2))
```

3.302.3 Rubi [A] (verified)

Time = 0.75 (sec) , antiderivative size = 330, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx$$
$$\Big\downarrow \; 2792$$

$$-bn\int\left(\frac{5e\text{arctanh}\left(\frac{\sqrt{ex^2+d}}{\sqrt{d}}\right)}{2d^{7/2}x}-\frac{15e^2x^4+20dex^2+3d^2}{6d^3x^3\left(ex^2+d\right)^{3/2}}\right)dx+\frac{5e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{7/2}}-\frac{5e(a+b\log(cx^n))}{2d^3\sqrt{d+ex^2}}-\frac{5e(a+b\log(cx^n))}{6d^2\left(d+ex^2\right)^{3/2}}-\frac{a+b\log(cx^n)}{2dx^2\left(d+ex^2\right)^{3/2}}$$

$$\Big\downarrow \text{2009}$$

$$\frac{5e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)(a+b\log(cx^n))}{2d^{7/2}}-\frac{5e(a+b\log(cx^n))}{2d^3\sqrt{d+ex^2}}-\frac{5e(a+b\log(cx^n))}{6d^2\left(d+ex^2\right)^{3/2}}-\frac{a+b\log(cx^n)}{2dx^2\left(d+ex^2\right)^{3/2}}-bn\left(\frac{5e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)^2}{4d^{7/2}}+\frac{31e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)}{12d^{7/2}}-\frac{5e\text{arctanh}\left(\frac{\sqrt{d+ex^2}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^2}}\right)}{2d^{7/2}}-\frac{5e\,\text{PolyLog}\left(2,1-\right.}{4d^{7/2}}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^2)^(5/2)),x]
```

output
```
(-5*e*(a + b*Log[c*x^n]))/(6*d^2*(d + e*x^2)^(3/2)) - (a + b*Log[c*x^n])/(
2*d*x^2*(d + e*x^2)^(3/2)) - (5*e*(a + b*Log[c*x^n]))/(2*d^3*Sqrt[d + e*x^
2]) + (5*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*d^(7/2)
) - b*n*(-1/3*e/(d^3*Sqrt[d + e*x^2]) + Sqrt[d + e*x^2]/(4*d^3*x^2) + (31*
e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]])/(12*d^(7/2)) + (5*e*ArcTanh[Sqrt[d + e
*x^2]/Sqrt[d]]^2)/(4*d^(7/2)) - (5*e*ArcTanh[Sqrt[d + e*x^2]/Sqrt[d]]*Log[
(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(2*d^(7/2)) - (5*e*PolyLog[2, 1
- (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^2])])/(4*d^(7/2)))
```

3.302.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.302. $\int \frac{a+b\log(cx^n)}{x^3(d+ex^2)^{5/2}}\,dx$

3.302.4 Maple [F]

$$\int \frac{a+b\ln \left(c\,x^{n}\right)}{x^{3} \left(e\,x^{2}+d\right)^{\frac{5}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(5/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(e*x^2+d)^(5/2),x)
```

3.302.5 Fricas [F]

$$\int \frac{a+b\log \left(cx^{n}\right)}{x^{3} \left(d+ex^{2}\right)^{5/2}}\,dx = \int \frac{b\log \left(cx^{n}\right)+a}{\left(ex^{2}+d\right)^{\frac{5}{2}}x^{3}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*log(c*x^n) + sqrt(e*x^2 + d)*a)/(e^3*x^9 + 3*d
*e^2*x^7 + 3*d^2*e*x^5 + d^3*x^3), x)
```

3.302.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log \left(cx^{n}\right)}{x^{3} \left(d+ex^{2}\right)^{5/2}}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(e*x**2+d)**(5/2),x)
```

output
```
Timed out
```

3.302.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a + b\log(cx^n)}{x^3(d + ex^2)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.302.8 Giac [F]

$$\int \frac{a + b\log(cx^n)}{x^3(d + ex^2)^{5/2}}\,dx = \int \frac{b\log(cx^n) + a}{(ex^2 + d)^{\frac{5}{2}}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(5/2)*x^3), x)
```

3.302.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{x^3(d + ex^2)^{5/2}}\,dx = \int \frac{a + b\ln(c\,x^n)}{x^3\,(e\,x^2 + d)^{5/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(5/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^2)^(5/2)), x)
```

3.303 $\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

3.303.1 Optimal result

Integrand size = 25, antiderivative size = 443

$$\begin{aligned}
\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx &= \frac{bdnx}{3e^3\sqrt{d+ex^2}} - \frac{bnx\sqrt{d+ex^2}}{4e^3} \\
&- \frac{31bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{12e^{7/2}\sqrt{d+ex^2}} - \frac{5bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{4e^{7/2}\sqrt{d+ex^2}} \\
&+ \frac{5bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{7/2}\sqrt{d+ex^2}} \\
&- \frac{x^5(a+b\log(cx^n))}{3e(d+ex^2)^{3/2}} - \frac{5x^3(a+b\log(cx^n))}{3e^2\sqrt{d+ex^2}} + \frac{5x\sqrt{d+ex^2}(a+b\log(cx^n))}{2e^3} \\
&- \frac{5d^{3/2}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{7/2}\sqrt{d+ex^2}} \\
&+ \frac{5bd^{3/2}n\sqrt{1+\frac{ex^2}{d}}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{4e^{7/2}\sqrt{d+ex^2}}
\end{aligned}$$

output
```
-1/3*x^5*(a+b*ln(c*x^n))/e/(e*x^2+d)^(3/2)+5/6*b*d*n*x/e^3/(e*x^2+d)^(1/2)
+1/2*b*n*x^3/e^2/(e*x^2+d)^(1/2)-5/3*x^3*(a+b*ln(c*x^n))/e^2/(e*x^2+d)^(1/
2)-3/4*b*n*x*(e*x^2+d)^(1/2)/e^3+5/2*x*(a+b*ln(c*x^n))*(e*x^2+d)^(1/2)/e^3
-31/12*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*(1+e*x^2/d)^(1/2)/e^(7/2)/(e
*x^2+d)^(1/2)-5/4*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))^2*(1+e*x^2/d)^(1/
2)/e^(7/2)/(e*x^2+d)^(1/2)-5*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*arctan
h((x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*(1+e*x^2/d)^(1/2)/e^(7/2)/(e*x^
2+d)^(1/2)+5/2*b*d^(3/2)*n*arcsinh(x*e^(1/2)/d^(1/2))*ln(1+(x*e^(1/2)/d^(1
/2)+(1+e*x^2/d)^(1/2))^2)*(1+e*x^2/d)^(1/2)/e^(7/2)/(e*x^2+d)^(1/2)-5/2*d^
(3/2)*arcsinh(x*e^(1/2)/d^(1/2))*(a+b*ln(c*x^n))*(1+e*x^2/d)^(1/2)/e^(7/2)
/(e*x^2+d)^(1/2)+5/4*b*d^(3/2)*n*polylog(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^
(1/2))^2)*(1+e*x^2/d)^(1/2)/e^(7/2)/(e*x^2+d)^(1/2)
```

3.303.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.21 (sec) , antiderivative size = 199, normalized size of antiderivative = 0.45

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{bnx^7\sqrt{1+\frac{ex^2}{d}}\left(5\,{}_3F_2\left(\frac{7}{2},\frac{7}{2},\frac{7}{2};\frac{9}{2},\frac{9}{2};-\frac{ex^2}{d}\right)+7\,\text{Hypergeometric2F1}\left(\frac{5}{2},\frac{7}{2},\frac{9}{2},-\frac{ex^2}{d}\right.\right.}{98d^2\sqrt{d+ex^2}} + \frac{x(15d^2+20dex^2+3e^2x^4)\left(a-bn\log(x)+b\log(cx^n)\right)}{6e^3(d+ex^2)^{3/2}} - \frac{5d(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{2e^{7/2}}$$

input
```
Integrate[(x^6*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(b*n*x^7*Sqrt[1 + (e*x^2)/d]*(5*HypergeometricPFQ[{7/2, 7/2, 7/2}, {9/2, 9
/2}, -((e*x^2)/d)] + 7*Hypergeometric2F1[5/2, 7/2, 9/2, -((e*x^2)/d)]*(-1
+ 2*Log[x])))/(98*d^2*Sqrt[d + e*x^2]) + (x*(15*d^2 + 20*d*e*x^2 + 3*e^2*x
^4)*(a - b*n*Log[x] + b*Log[c*x^n]))/(6*e^3*(d + e*x^2)^(3/2)) - (5*d*(a -
 b*n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(2*e^(7/2)
)
```

3.303.3 Rubi [A] (verified)

Time = 0.77 (sec) , antiderivative size = 367, normalized size of antiderivative = 0.83, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2786, 2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}dx$$

$$\Big\downarrow \text{2786}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\int \frac{x^6(a+b\log(cx^n))}{\left(\frac{ex^2}{d}+1\right)^{5/2}}dx}{d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-bn\int \left(\frac{d^3\sqrt{\frac{ex^2}{d}+1}(3e^2x^4+20dex^2+15d^2)}{6e^3(ex^2+d)^2}-\frac{5d^{7/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{2e^{7/2}x}\right)dx-\frac{5d^{7/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{7/2}}+\frac{5d^3x\sqrt{}}{}\right.}{d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-\frac{5d^{7/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{2e^{7/2}}+\frac{5d^3x\sqrt{\frac{ex^2}{d}+1}(a+b\log(cx^n))}{2e^3}-\frac{5d^2x^3(a+b\log(cx^n))}{3e^2\sqrt{\frac{ex^2}{d}+1}}-\frac{dx^5(a+b\log(cx^n))}{3e\left(\frac{ex^2}{d}+1\right)^{3/2}}-bn\left(\right.\right.}{}$$

input
```
Int[(x^6*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(Sqrt[1 + (e*x^2)/d]*(-1/3*(d*x^5*(a + b*Log[c*x^n]))/(e*(1 + (e*x^2)/d)^(
3/2)) - (5*d^2*x^3*(a + b*Log[c*x^n]))/(3*e^2*Sqrt[1 + (e*x^2)/d]) + (5*d^
3*x*Sqrt[1 + (e*x^2)/d]*(a + b*Log[c*x^n]))/(2*e^3) - (5*d^(7/2)*ArcSinh[(
Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/(2*e^(7/2)) - b*n*(-1/3*(d^3*x)/(e
^3*Sqrt[1 + (e*x^2)/d]) + (d^3*x*Sqrt[1 + (e*x^2)/d])/(4*e^3) + (31*d^(7/2
)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/(12*e^(7/2)) + (5*d^(7/2)*ArcSinh[(Sqrt[e]
*x)/Sqrt[d]]^2)/(4*e^(7/2)) - (5*d^(7/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]*Log[
1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*e^(7/2)) - (5*d^(7/2)*PolyLog[
2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(4*e^(7/2)))))/(d^2*Sqrt[d + e*x^2
])
```

3.303.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.303.4 Maple [F]

$$\int \frac{x^6(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}dx$$

input
```
int(x^6*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x^6*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

3.303.5 Fricas [F]

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^6}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^6*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*x^6*log(c*x^n) + sqrt(e*x^2 + d)*a*x^6)/(e^3*x
^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 + d^3), x)
```

3.303.6 Sympy [F(-1)]

Timed out.

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \text{Timed out}$$

input
```
integrate(x**6*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
Timed out
```

3.303.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^6*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.303.8 Giac [F]

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^6}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^6*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^6/(e*x^2 + d)^(5/2), x)
```

3.303.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^6(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{x^6\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((x^6*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x^6*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.304 $\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

3.304.1 Optimal result

Integrand size = 25, antiderivative size = 383

$$\begin{aligned}\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx &= -\frac{bnx}{3e^2\sqrt{d+ex^2}} \\ &+ \frac{4b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{3e^{5/2}\sqrt{d+ex^2}} + \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)^2}{2e^{5/2}\sqrt{d+ex^2}} \\ &- \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)\log\left(1-e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{e^{5/2}\sqrt{d+ex^2}} - \frac{x^3(a+b\log(cx^n))}{3e(d+ex^2)^{3/2}} \\ &- \frac{x(a+b\log(cx^n))}{e^2\sqrt{d+ex^2}} + \frac{\sqrt{d}\sqrt{1+\frac{ex^2}{d}}\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{5/2}\sqrt{d+ex^2}} \\ &- \frac{b\sqrt{d}n\sqrt{1+\frac{ex^2}{d}}\operatorname{PolyLog}\left(2,e^{2\operatorname{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{5/2}\sqrt{d+ex^2}}\end{aligned}$$

output
```
-1/3*x^3*(a+b*ln(c*x^n))/e/(e*x^2+d)^(3/2)-1/3*b*n*x/e^2/(e*x^2+d)^(1/2)-x
*(a+b*ln(c*x^n))/e^2/(e*x^2+d)^(1/2)+4/3*b*n*arcsinh(x*e^(1/2)/d^(1/2))*d^
(1/2)*(1+e*x^2/d)^(1/2)/e^(5/2)/(e*x^2+d)^(1/2)+1/2*b*n*arcsinh(x*e^(1/2)/
d^(1/2))^2*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(5/2)/(e*x^2+d)^(1/2)-b*n*arcsinh(x
*e^(1/2)/d^(1/2))*ln(1-(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*d^(1/2)*(1
+e*x^2/d)^(1/2)/e^(5/2)/(e*x^2+d)^(1/2)+arcsinh(x*e^(1/2)/d^(1/2))*(a+b*ln
(c*x^n))*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(5/2)/(e*x^2+d)^(1/2)-1/2*b*n*polylog
(2,(x*e^(1/2)/d^(1/2)+(1+e*x^2/d)^(1/2))^2)*d^(1/2)*(1+e*x^2/d)^(1/2)/e^(5
/2)/(e*x^2+d)^(1/2)
```

3.304.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.59 (sec) , antiderivative size = 244, normalized size of antiderivative = 0.64

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx =$$

$$-\frac{bn\sqrt{1+\frac{ex^2}{d}}\left(3e^{5/2}x^5(d+ex^2)^2\,{}_3F_2\left(\frac{5}{2},\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{ex^2}{d}\right)+25d^3\sqrt{e}x(3d+4ex^2)\sqrt{1+\frac{ex^2}{d}}\log(x)-75d^{5/2}(\cdots\right.}{75d^2e^{5/2}(d+ex^2)^{5/2}}$$

$$-\frac{x(3d+4ex^2)(a-bn\log(x)+b\log(cx^n))}{3e^2(d+ex^2)^{3/2}}$$

$$+\frac{(a-bn\log(x)+b\log(cx^n))\log\left(ex+\sqrt{e}\sqrt{d+ex^2}\right)}{e^{5/2}}$$

input
```
Integrate[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
-1/75*(b*n*Sqrt[1 + (e*x^2)/d]*(3*e^(5/2)*x^5*(d + e*x^2)^2*Hypergeometric
PFQ[{5/2, 5/2, 5/2}, {7/2, 7/2}, -((e*x^2)/d)] + 25*d^3*Sqrt[e]*x*(3*d + 4
*e*x^2)*Sqrt[1 + (e*x^2)/d]*Log[x] - 75*d^(5/2)*(d + e*x^2)^2*ArcSinh[(Sqr
t[e]*x)/Sqrt[d]]*Log[x]))/(d^2*e^(5/2)*(d + e*x^2)^(5/2)) - (x*(3*d + 4*e*
x^2)*(a - b*n*Log[x] + b*Log[c*x^n]))/(3*e^2*(d + e*x^2)^(3/2)) + ((a - b*
n*Log[x] + b*Log[c*x^n])*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/e^(5/2)
```

3.304.3 Rubi [A] (verified)

Time = 0.75 (sec) , antiderivative size = 297, normalized size of antiderivative = 0.78, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2786, 2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}dx$$

$$\Big\downarrow \text{2786}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\int \frac{x^4(a+b\log(cx^n))}{\left(\frac{ex^2}{d}+1\right)^{5/2}}dx}{d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(-bn\int \left(\frac{d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}{e^{5/2}x}-\frac{d^3(4ex^2+3d)\sqrt{\frac{ex^2}{d}+1}}{3e^2(ex^2+d)^2}\right)dx+\frac{d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{5/2}}-\frac{d^2x(a+b\log(cx^n))}{e^2\sqrt{\frac{ex^2}{d}+1}}-\right.}{d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\sqrt{\frac{ex^2}{d}+1}\left(\frac{d^{5/2}\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)(a+b\log(cx^n))}{e^{5/2}}-\frac{d^2x(a+b\log(cx^n))}{e^2\sqrt{\frac{ex^2}{d}+1}}-\frac{dx^3(a+b\log(cx^n))}{3e\left(\frac{ex^2}{d}+1\right)^{3/2}}-bn\left(\frac{d^{5/2}\text{PolyLog}\left(2,e^{2\text{arcsinh}\left(\frac{\sqrt{e}x}{\sqrt{d}}\right)}\right)}{2e^{5/2}}-\right.\right.}{d^2\sqrt{d+ex^2}}$$

input
```
Int[(x^4*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(Sqrt[1 + (e*x^2)/d]*(-1/3*(d*x^3*(a + b*Log[c*x^n]))/(e*(1 + (e*x^2)/d)^(
3/2)) - (d^2*x*(a + b*Log[c*x^n]))/(e^2*Sqrt[1 + (e*x^2)/d]) + (d^(5/2)*Ar
cSinh[(Sqrt[e]*x)/Sqrt[d]]*(a + b*Log[c*x^n]))/e^(5/2) - b*n*((d^2*x)/(3*e
^2*Sqrt[1 + (e*x^2)/d]) - (4*d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])/(3*e^(5
/2)) - (d^(5/2)*ArcSinh[(Sqrt[e]*x)/Sqrt[d]]^2)/(2*e^(5/2)) + (d^(5/2)*Arc
Sinh[(Sqrt[e]*x)/Sqrt[d]]*Log[1 - E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/e^(
5/2) + (d^(5/2)*PolyLog[2, E^(2*ArcSinh[(Sqrt[e]*x)/Sqrt[d]])])/(2*e^(5/2)
))))/(d^2*Sqrt[d + e*x^2])
```

3.304.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2786
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^2)^
(q_), x_Symbol] :> Simp[d^IntPart[q]*((d + e*x^2)^FracPart[q]/(1 + (e/d)*x^
2)^FracPart[q])   Int[x^m*(1 + (e/d)*x^2)^q*(a + b*Log[c*x^n]), x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && IntegerQ[m/2] && IntegerQ[q - 1/2] &&  !(LtQ
[m + 2*q, -2] || GtQ[d, 0])
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.304.4 Maple [F]

$$\int \frac{x^4(a+b\ln(c\,x^n))}{(e\,x^2+d)^{\frac{5}{2}}}dx$$

input
```
int(x^4*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x^4*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

3.304.5 Fricas [F]

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^4}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
integral((sqrt(e*x^2 + d)*b*x^4*log(c*x^n) + sqrt(e*x^2 + d)*a*x^4)/(e^3*x
^6 + 3*d*e^2*x^4 + 3*d^2*e*x^2 + d^3), x)
```

3.304.6 Sympy [F]

$$\int \frac{x^4(a+b\log{(cx^n)})}{(d+ex^2)^{5/2}}\,dx = \int \frac{x^4(a+b\log{(cx^n)})}{(d+ex^2)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x**4*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
Integral(x**4*(a + b*log(c*x**n))/(d + e*x**2)**(5/2), x)
```

3.304.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{x^4(a+b\log{(cx^n)})}{(d+ex^2)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.304.8 Giac [F]

$$\int \frac{x^4(a+b\log{(cx^n)})}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log{(cx^n)}+a)x^4}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^4*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^4/(e*x^2 + d)^(5/2), x)
```

3.304.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^4(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{x^4\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x^4*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.305 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx$

3.305.1 Optimal result

Integrand size = 25, antiderivative size = 89

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{bnx}{3de\sqrt{d+ex^2}} - \frac{bn\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3de^{3/2}} + \frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}$$

output
```
-1/3*b*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d/e^(3/2)+1/3*x^3*(a+b*ln(c*x^
n))/d/(e*x^2+d)^(3/2)+1/3*b*n*x/d/e/(e*x^2+d)^(1/2)
```

3.305.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 101, normalized size of antiderivative = 1.13

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \frac{\sqrt{e}x(aex^2+bn(d+ex^2)) + be^{3/2}x^3\log(cx^n) - bn(d+ex^2)^{3/2}\log\left(ex+\sqrt{e}\sqrt{d\ldots}\right.}{3de^{3/2}(d+ex^2)^{3/2}}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
(Sqrt[e]*x*(a*e*x^2 + b*n*(d + e*x^2)) + b*e^(3/2)*x^3*Log[c*x^n] - b*n*(d
 + e*x^2)^(3/2)*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(3*d*e^(3/2)*(d + e*x^
2)^(3/2))
```

3.305.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 84, normalized size of antiderivative = 0.94, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.160, Rules used = {2773, 252, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}dx$$

$$\Big\downarrow \text{ 2773}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bn\int \frac{x^2}{(ex^2+d)^{3/2}}dx}{3d}$$

$$\Big\downarrow \text{ 252}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bn\left(\frac{\int \frac{1}{\sqrt{ex^2+d}}dx}{e}-\frac{x}{e\sqrt{d+ex^2}}\right)}{3d}$$

$$\Big\downarrow \text{ 224}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bn\left(\frac{\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}}{e}-\frac{x}{e\sqrt{d+ex^2}}\right)}{3d}$$

$$\Big\downarrow \text{ 219}$$

$$\frac{x^3(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bn\left(\frac{\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{e^{3/2}}-\frac{x}{e\sqrt{d+ex^2}}\right)}{3d}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^2)^(5/2),x]
```

output
```
-1/3*(b*n*(-(x/(e*Sqrt[d + e*x^2])) + ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]
/e^(3/2)))/d + (x^3*(a + b*Log[c*x^n]))/(3*d*(d + e*x^2)^(3/2))
```

3.305.3.1 Defintions of rubi rules used

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 252
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[c*(c*x
)^(m - 1)*((a + b*x^2)^(p + 1)/(2*b*(p + 1))), x] - Simp[c^2*((m - 1)/(2*b*
(p + 1)))   Int[(c*x)^(m - 2)*(a + b*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c
}, x] && LtQ[p, -1] && GtQ[m, 1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomi
alQ[a, b, c, 2, m, p, x]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

3.305.4 Maple [F]

$$\int \frac{x^{2} \left(a +b \ln \left(c \,x^{n}\right)\right)}{\left(e \,x^{2}+d \right)^{\frac{5}{2}}}d x$$

input
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

3.305.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 277, normalized size of antiderivative = 3.11

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \left[\frac{(be^2nx^4+2\,bdenx^2+bd^2n)\sqrt{e}\log\left(-2\,ex^2+2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)+2\,(be^2nx^3}{6\,(de^4x^4+2\,d^2e^3x^2+d}\right.$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/6*((b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(e)*log(-2*e*x^2 + 2*sqr
t(e*x^2 + d)*sqrt(e)*x - d) + 2*(b*e^2*n*x^3*log(x) + b*e^2*x^3*log(c) + b
*d*e*n*x + (b*e^2*n + a*e^2)*x^3)*sqrt(e*x^2 + d))/(d*e^4*x^4 + 2*d^2*e^3*
x^2 + d^3*e^2), 1/3*((b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(-e)*arct
an(sqrt(-e)*x/sqrt(e*x^2 + d)) + (b*e^2*n*x^3*log(x) + b*e^2*x^3*log(c) +
b*d*e*n*x + (b*e^2*n + a*e^2)*x^3)*sqrt(e*x^2 + d))/(d*e^4*x^4 + 2*d^2*e^3
*x^2 + d^3*e^2)]
```

3.305.6 Sympy [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**2)**(5/2), x)
```

3.305.7 Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
-1/3*a*(x/((e*x^2 + d)^(3/2)*e) - x/(sqrt(e*x^2 + d)*d*e)) + b*integrate((
x^2*log(c) + x^2*log(x^n))/((e^2*x^4 + 2*d*e*x^2 + d^2)*sqrt(e*x^2 + d)),
x)
```

3.305.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^2 + d)^(5/2), x)
```

3.305.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^2)^{5/2}}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^2)^(5/2), x)
```

3.306 $\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx$

3.306.1 Optimal result

Integrand size = 22, antiderivative size = 113

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx = -\frac{bnx}{3d^2\sqrt{d+ex^2}} - \frac{2bn\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3d^2\sqrt{e}} + \frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}} + \frac{2x(a+b\log(cx^n))}{3d^2\sqrt{d+ex^2}}$$

output
```
1/3*x*(a+b*ln(c*x^n))/d/(e*x^2+d)^(3/2)-2/3*b*n*arctanh(x*e^(1/2)/(e*x^2+d
)^(1/2))/d^2/e^(1/2)-1/3*b*n*x/d^2/(e*x^2+d)^(1/2)+2/3*x*(a+b*ln(c*x^n))/d
^2/(e*x^2+d)^(1/2)
```

3.306.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.03

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx = \frac{\sqrt{e}x(-bn(d+ex^2)+a(3d+2ex^2))+b\sqrt{e}x(3d+2ex^2)\log(cx^n)-2bn(d+ex^2)^{3/2}}{3d^2\sqrt{e}(d+ex^2)^{3/2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^2)^(5/2),x]
```

output
```
(Sqrt[e]*x*(-(b*n*(d + e*x^2)) + a*(3*d + 2*e*x^2)) + b*Sqrt[e]*x*(3*d + 2
*e*x^2)*Log[c*x^n] - 2*b*n*(d + e*x^2)^(3/2)*Log[e*x + Sqrt[e]*Sqrt[d + e*
x^2]])/(3*d^2*Sqrt[e]*(d + e*x^2)^(3/2))
```

3.306.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.03, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227, Rules used = {2760, 208, 2751, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx$$

$$\Big\downarrow \text{2760}$$

$$\frac{2\int \frac{a+b\log(cx^n)}{(ex^2+d)^{3/2}}dx}{3d}-\frac{bn\int \frac{1}{(ex^2+d)^{3/2}}dx}{3d}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{208}$$

$$\frac{2\int \frac{a+b\log(cx^n)}{(ex^2+d)^{3/2}}dx}{3d}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bnx}{3d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{2751}$$

$$\frac{2\left(\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}-\frac{bn\int \frac{1}{\sqrt{ex^2+d}}dx}{d}\right)}{3d}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bnx}{3d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{224}$$

$$\frac{2\left(\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}-\frac{bn\int \frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}}{d}\right)}{3d}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bnx}{3d^2\sqrt{d+ex^2}}$$

$$\Big\downarrow \text{219}$$

$$\frac{2\left(\frac{x(a+b\log(cx^n))}{d\sqrt{d+ex^2}}-\frac{bn\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{d\sqrt{e}}\right)}{3d}+\frac{x(a+b\log(cx^n))}{3d(d+ex^2)^{3/2}}-\frac{bnx}{3d^2\sqrt{d+ex^2}}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^2)^(5/2),x]
```

output
```
-1/3*(b*n*x)/(d^2*Sqrt[d + e*x^2]) + (x*(a + b*Log[c*x^n]))/(3*d*(d + e*x^
2)^(3/2)) + (2*(-((b*n*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]])/(d*Sqrt[e]))
+ (x*(a + b*Log[c*x^n]))/(d*Sqrt[d + e*x^2])))/(3*d)
```

3.306.3.1 Defintions of rubi rules used

rule 208
```
Int[((a_) + (b_.)*(x_)^2)^(-3/2), x_Symbol] :> Simp[x/(a*Sqrt[a + b*x^2]),
x] /; FreeQ[{a, b}, x]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] && !GtQ[a, 0]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

rule 2760
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^2)^(q_), x_Sym
bol] :> Simp[(-x)*(d + e*x^2)^(q + 1)*((a + b*Log[c*x^n])/(2*d*(q + 1))), x
] + (Simp[(2*q + 3)/(2*d*(q + 1))   Int[(d + e*x^2)^(q + 1)*(a + b*Log[c*x^
n]), x], x] + Simp[b*(n/(2*d*(q + 1)))   Int[(d + e*x^2)^(q + 1), x], x]) /
; FreeQ[{a, b, c, d, e, n}, x] && LtQ[q, -1]
```

3.306.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\left(e\,x^{2}+d\right)^{\frac{5}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

output
```
int((a+b*ln(c*x^n))/(e*x^2+d)^(5/2),x)
```

3.306.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 337, normalized size of antiderivative = 2.98

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx = \left[\frac{(be^2nx^4+2\,bdenx^2+bd^2n)\sqrt{e}\log\left(-2\,ex^2+2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)-((be^2n-2\,ae}{3\,(d^2e^3x^4}\right.$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/3*((b*e^2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(e)*log(-2*e*x^2 + 2*sqr
t(e*x^2 + d)*sqrt(e)*x - d) - ((b*e^2*n - 2*a*e^2)*x^3 + (b*d*e*n - 3*a*d*
e)*x - (2*b*e^2*x^3 + 3*b*d*e*x)*log(c) - (2*b*e^2*n*x^3 + 3*b*d*e*n*x)*lo
g(x))*sqrt(e*x^2 + d))/(d^2*e^3*x^4 + 2*d^3*e^2*x^2 + d^4*e), 1/3*(2*(b*e^
2*n*x^4 + 2*b*d*e*n*x^2 + b*d^2*n)*sqrt(-e)*arctan(sqrt(-e)*x/sqrt(e*x^2 +
 d)) - ((b*e^2*n - 2*a*e^2)*x^3 + (b*d*e*n - 3*a*d*e)*x - (2*b*e^2*x^3 + 3
*b*d*e*x)*log(c) - (2*b*e^2*n*x^3 + 3*b*d*e*n*x)*log(x))*sqrt(e*x^2 + d))/
(d^2*e^3*x^4 + 2*d^3*e^2*x^2 + d^4*e)]
```

3.306.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx = \int \frac{a+b\log(cx^n)}{(d+ex^2)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**2+d)**(5/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**2)**(5/2), x)
```

3.306.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{(d+ex^2)^{5/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
1/3*a*(2*x/(sqrt(e*x^2 + d)*d^2) + x/((e*x^2 + d)^(3/2)*d)) + b*integrate(
(log(c) + log(x^n))/((e^2*x^4 + 2*d*e*x^2 + d^2)*sqrt(e*x^2 + d)), x)
```

3.306.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^{5/2}}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^{\frac{5}{2}}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^2 + d)^(5/2), x)
```

3.306.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^2\right)^{5/2}}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{\left(e\,x^2+d\right)^{5/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^2)^(5/2),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^2)^(5/2), x)
```

3.307 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx$

3.307.1 Optimal result

Integrand size = 25, antiderivative size = 166

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx = -\frac{bn}{d^2x\sqrt{d+ex^2}} - \frac{2benx}{3d^3\sqrt{d+ex^2}} + \frac{8b\sqrt{e}n\,\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3d^3} - \frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}} - \frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}} - \frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}$$

output
```
(-a-b*ln(c*x^n))/d/x/(e*x^2+d)^(3/2)-4/3*e*x*(a+b*ln(c*x^n))/d^2/(e*x^2+d)
^(3/2)+8/3*b*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))*e^(1/2)/d^3-b*n/d^2/x/(e
*x^2+d)^(1/2)-2/3*b*e*n*x/d^3/(e*x^2+d)^(1/2)-8/3*e*x*(a+b*ln(c*x^n))/d^3/
(e*x^2+d)^(1/2)
```

3.307.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 144, normalized size of antiderivative = 0.87

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx = \frac{-3ad^2-3bd^2n-12adex^2-5bdenx^2-8ae^2x^4-2be^2nx^4-b(3d^2+12dex^2+8e^2x}{3d^3x(d+ex^2)^{3/2}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^(5/2)),x]
```

output
```
(-3*a*d^2 - 3*b*d^2*n - 12*a*d*e*x^2 - 5*b*d*e*n*x^2 - 8*a*e^2*x^4 - 2*b*e
^2*n*x^4 - b*(3*d^2 + 12*d*e*x^2 + 8*e^2*x^4)*Log[c*x^n] + 8*b*Sqrt[e]*n*x
*(d + e*x^2)^(3/2)*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(3*d^3*x*(d + e*x^2
)^(3/2))
```

3.307.3 Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 161, normalized size of antiderivative = 0.97, number of steps used = 8, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.280, Rules used = {2792, 27, 1588, 27, 298, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int -\frac{8e^2x^4+12dex^2+3d^2}{3d^3x^2(ex^2+d)^{3/2}}dx-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{8e^2x^4+12dex^2+3d^2}{x^2(ex^2+d)^{3/2}}dx}{3d^3}-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{1588}$$

$$\frac{bn\left(-\frac{\int -\frac{2de(4ex^2+3d)}{(ex^2+d)^{3/2}}dx}{d}-\frac{3d}{x\sqrt{d+ex^2}}\right)}{3d^3}-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\left(2e\int \frac{4ex^2+3d}{(ex^2+d)^{3/2}}dx-\frac{3d}{x\sqrt{d+ex^2}}\right)}{3d^3}-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{298}$$

$$\frac{bn\left(2e\left(4\int\frac{1}{\sqrt{ex^2+d}}dx-\frac{x}{\sqrt{d+ex^2}}\right)-\frac{3d}{x\sqrt{d+ex^2}}\right)}{3d^3}-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}$$

$\Big\downarrow$ 224

$$\frac{bn\left(2e\left(4\int\frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{x}{\sqrt{d+ex^2}}\right)-\frac{3d}{x\sqrt{d+ex^2}}\right)}{3d^3}-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}$$

$\Big\downarrow$ 219

$$-\frac{8ex(a+b\log(cx^n))}{3d^3\sqrt{d+ex^2}}-\frac{4ex(a+b\log(cx^n))}{3d^2(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{dx(d+ex^2)^{3/2}}+\frac{bn\left(2e\left(\frac{4\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{\sqrt{e}}-\frac{x}{\sqrt{d+ex^2}}\right)-\frac{3d}{x\sqrt{d+ex^2}}\right)}{3d^3}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^2)^(5/2)),x]
```

output
```
(b*n*((-3*d)/(x*Sqrt[d + e*x^2]) + 2*e*(-(x/Sqrt[d + e*x^2]) + (4*ArcTanh[
(Sqrt[e]*x)/Sqrt[d + e*x^2]])/Sqrt[e])))/(3*d^3) - (a + b*Log[c*x^n])/(d*x
*(d + e*x^2)^(3/2)) - (4*e*x*(a + b*Log[c*x^n]))/(3*d^2*(d + e*x^2)^(3/2))
 - (8*e*x*(a + b*Log[c*x^n]))/(3*d^3*Sqrt[d + e*x^2])
```

3.307.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

3.307. $\int\frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx$

rule 298
```
Int[((a_) + (b_.)*(x_)^2)^(p_)*((c_) + (d_.)*(x_)^2), x_Symbol] :> Simp[(-(
b*c - a*d))*x*((a + b*x^2)^(p + 1)/(2*a*b*(p + 1))), x] - Simp[(a*d - b*c*(
2*p + 3))/(2*a*b*(p + 1))   Int[(a + b*x^2)^(p + 1), x], x] /; FreeQ[{a, b,
 c, d, p}, x] && NeQ[b*c - a*d, 0] && (LtQ[p, -1] || ILtQ[1/2 + p, 0])
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.307.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{2}\left(e\,x^{2}+d\right)^{\frac{5}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(5/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(e*x^2+d)^(5/2),x)
```

3.307.5 Fricas [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 399, normalized size of antiderivative = 2.40

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx = \left[\frac{4\,(be^2nx^5+2\,bdenx^3+bd^2nx)\sqrt{e}\log\left(-2\,ex^2-2\,\sqrt{ex^2+d}\sqrt{e}x-d\right)-(2\,(be^2n+\right.$$

$$-\frac{8\,(be^2nx^5+2\,bdenx^3+bd^2nx)\sqrt{-e}\arctan\left(\frac{\sqrt{-e}x}{\sqrt{ex^2+d}}\right)+(2\,(be^2n+4\,ae^2)x^4+3\,bd^2n+3\,ad^2+(5\,bden+1}{3\,(d^3e^2x^5+2\,d^4e}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/3*(4*(b*e^2*n*x^5 + 2*b*d*e*n*x^3 + b*d^2*n*x)*sqrt(e)*log(-2*e*x^2 - 2
*sqrt(e*x^2 + d)*sqrt(e)*x - d) - (2*(b*e^2*n + 4*a*e^2)*x^4 + 3*b*d^2*n +
 3*a*d^2 + (5*b*d*e*n + 12*a*d*e)*x^2 + (8*b*e^2*x^4 + 12*b*d*e*x^2 + 3*b*
d^2)*log(c) + (8*b*e^2*n*x^4 + 12*b*d*e*n*x^2 + 3*b*d^2*n)*log(x))*sqrt(e*
x^2 + d))/(d^3*e^2*x^5 + 2*d^4*e*x^3 + d^5*x), -1/3*(8*(b*e^2*n*x^5 + 2*b*
d*e*n*x^3 + b*d^2*n*x)*sqrt(-e)*arctan(sqrt(-e)*x/sqrt(e*x^2 + d)) + (2*(b
*e^2*n + 4*a*e^2)*x^4 + 3*b*d^2*n + 3*a*d^2 + (5*b*d*e*n + 12*a*d*e)*x^2 +
 (8*b*e^2*x^4 + 12*b*d*e*x^2 + 3*b*d^2)*log(c) + (8*b*e^2*n*x^4 + 12*b*d*e
*n*x^2 + 3*b*d^2*n)*log(x))*sqrt(e*x^2 + d))/(d^3*e^2*x^5 + 2*d^4*e*x^3 +
d^5*x)]
```

3.307.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(e*x**2+d)**(5/2),x)
```

output
```
Timed out
```

3.307.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.307.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^2+d)^{\frac{5}{2}}x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(5/2)*x^2), x)
```

3.307.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^2)^{5/2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(e\,x^2+d)^{5/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(5/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^2)^(5/2)), x)
```

3.308 $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{5/2}}\,dx$

3.308.1 Optimal result

Integrand size = 25, antiderivative size = 230

$$\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{5/2}}\,dx = -\frac{be^2nx}{3d^4\sqrt{d+ex^2}}-\frac{bn\sqrt{d+ex^2}}{9d^3x^3}+\frac{23ben\sqrt{d+ex^2}}{9d^4x}-\frac{16be^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)}{3d^4}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}$$

output
```
-16/3*b*e^(3/2)*n*arctanh(x*e^(1/2)/(e*x^2+d)^(1/2))/d^4+1/3*(-a-b*ln(c*x^
n))/d/x^3/(e*x^2+d)^(3/2)+2*e*(a+b*ln(c*x^n))/d^2/x/(e*x^2+d)^(3/2)+8/3*e^
2*x*(a+b*ln(c*x^n))/d^3/(e*x^2+d)^(3/2)-1/3*b*e^2*n*x/d^4/(e*x^2+d)^(1/2)+
16/3*e^2*x*(a+b*ln(c*x^n))/d^4/(e*x^2+d)^(1/2)-1/9*b*n*(e*x^2+d)^(1/2)/d^3
/x^3+23/9*b*e*n*(e*x^2+d)^(1/2)/d^4/x
```

3.308.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 182, normalized size of antiderivative = 0.79

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx = \frac{-3ad^3-bd^3n+18ad^2ex^2+21bd^2enx^2+72ade^2x^4+42bde^2nx^4+48ae^3x^6+20be^3}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^(5/2)),x]
```

output
```
(-3*a*d^3 - b*d^3*n + 18*a*d^2*e*x^2 + 21*b*d^2*e*n*x^2 + 72*a*d*e^2*x^4 +
 42*b*d*e^2*n*x^4 + 48*a*e^3*x^6 + 20*b*e^3*n*x^6 + 3*b*(-d^3 + 6*d^2*e*x^
2 + 24*d*e^2*x^4 + 16*e^3*x^6)*Log[c*x^n] - 48*b*e^(3/2)*n*x^3*(d + e*x^2)
^(3/2)*Log[e*x + Sqrt[e]*Sqrt[d + e*x^2]])/(9*d^4*x^3*(d + e*x^2)^(3/2))
```

3.308.3 Rubi [A] (verified)

Time = 0.57 (sec) , antiderivative size = 228, normalized size of antiderivative = 0.99, number of steps used = 10, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.360, Rules used = {2792, 27, 2336, 25, 1588, 27, 358, 224, 219}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx$$

$$\Big\downarrow \ 2792$$

$$-bn\int -\frac{-16e^3x^6-24de^2x^4-6d^2ex^2+d^3}{3d^4x^4\left(ex^2+d\right)^{3/2}}dx+\frac{16e^2x(a+b\log\left(cx^n\right))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log\left(cx^n\right))}{3d^3\left(d+ex^2\right)^{3/2}}+\frac{2e(a+b\log\left(cx^n\right))}{d^2x\left(d+ex^2\right)^{3/2}}-\frac{a+b\log\left(cx^n\right)}{3dx^3\left(d+ex^2\right)^{3/2}}$$

$$\Big\downarrow \ 27$$

$$\frac{bn\int \frac{-16e^3x^6-24de^2x^4-6d^2ex^2+d^3}{x^4\left(ex^2+d\right)^{3/2}}dx}{3d^4}+\frac{16e^2x(a+b\log\left(cx^n\right))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log\left(cx^n\right))}{3d^3\left(d+ex^2\right)^{3/2}}+\frac{2e(a+b\log\left(cx^n\right))}{d^2x\left(d+ex^2\right)^{3/2}}-\frac{a+b\log\left(cx^n\right)}{3dx^3\left(d+ex^2\right)^{3/2}}$$

$$\Big\downarrow \ 2336$$

$$\frac{bn\left(-\frac{\int -\frac{-16de^2x^4-7d^2ex^2+d^3}{x^4\sqrt{ex^2+d}}dx}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}+\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}$$

$$\Big\downarrow \; 25$$

$$\frac{bn\left(\frac{\int \frac{-16de^2x^4-7d^2ex^2+d^3}{x^4\sqrt{ex^2+d}}dx}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}+\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}$$

$$\Big\downarrow \; 1588$$

$$\frac{bn\left(\frac{-\frac{\int \frac{d^2e\left(48ex^2+23d\right)}{x^2\sqrt{ex^2+d}}dx}{3d}-\frac{d^2\sqrt{d+ex^2}}{3x^3}}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}+\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}$$

$$\Big\downarrow \; 27$$

$$\frac{bn\left(\frac{-\frac{1}{3}de\int \frac{48ex^2+23d}{x^2\sqrt{ex^2+d}}dx-\frac{d^2\sqrt{d+ex^2}}{3x^3}}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}+\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}$$

$$\Big\downarrow \; 358$$

$$\frac{bn\left(\frac{-\frac{1}{3}de\left(48e\int \frac{1}{\sqrt{ex^2+d}}dx-\frac{23\sqrt{d+ex^2}}{x}\right)-\frac{d^2\sqrt{d+ex^2}}{3x^3}}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}+\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}$$

$$\Big\downarrow \; 224$$

3.308. $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{5/2}}\,dx$

$$\frac{bn\left(\frac{-\frac{1}{3}de\left(48e\int\frac{1}{1-\frac{ex^2}{ex^2+d}}d\frac{x}{\sqrt{ex^2+d}}-\frac{23\sqrt{d+ex^2}}{x}\right)-\frac{d^2\sqrt{d+ex^2}}{3x^3}}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}+\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}$$

$$\Big\downarrow \text{219}$$

$$\frac{16e^2x(a+b\log(cx^n))}{3d^4\sqrt{d+ex^2}}+\frac{8e^2x(a+b\log(cx^n))}{3d^3(d+ex^2)^{3/2}}+\frac{2e(a+b\log(cx^n))}{d^2x(d+ex^2)^{3/2}}-\frac{a+b\log(cx^n)}{3dx^3(d+ex^2)^{3/2}}+\frac{bn\left(\frac{-\frac{1}{3}de\left(48\sqrt{e}\text{arctanh}\left(\frac{\sqrt{e}x}{\sqrt{d+ex^2}}\right)-\frac{23\sqrt{d+ex^2}}{x}\right)-\frac{d^2\sqrt{d+ex^2}}{3x^3}}{d}-\frac{e^2x}{\sqrt{d+ex^2}}\right)}{3d^4}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*(d + e*x^2)^(5/2)),x]
```

output
```
(b*n*(-((e^2*x)/Sqrt[d + e*x^2]) + (-1/3*(d^2*Sqrt[d + e*x^2])/x^3 - (d*e*
((-23*Sqrt[d + e*x^2])/x + 48*Sqrt[e]*ArcTanh[(Sqrt[e]*x)/Sqrt[d + e*x^2]]
))/3)/d))/(3*d^4) - (a + b*Log[c*x^n])/(3*d*x^3*(d + e*x^2)^(3/2)) + (2*e*
(a + b*Log[c*x^n]))/(d^2*x*(d + e*x^2)^(3/2)) + (8*e^2*x*(a + b*Log[c*x^n]
))/(3*d^3*(d + e*x^2)^(3/2)) + (16*e^2*x*(a + b*Log[c*x^n]))/(3*d^4*Sqrt[d
 + e*x^2])
```

3.308.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 219
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[-b, 2]))*
ArcTanh[Rt[-b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

3.308. $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{5/2}}\,dx$

rule 224
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Subst[Int[1/(1 - b*x^2), x],
x, x/Sqrt[a + b*x^2]] /; FreeQ[{a, b}, x] &&  !GtQ[a, 0]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 1588
```
Int[((f_.)*(x_))^(m_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c
_.)*(x_)^4)^(p_.), x_Symbol] :> With[{Qx = PolynomialQuotient[(a + b*x^2 +
c*x^4)^p, f*x, x], R = PolynomialRemainder[(a + b*x^2 + c*x^4)^p, f*x, x]},
 Simp[R*(f*x)^(m + 1)*((d + e*x^2)^(q + 1)/(d*f*(m + 1))), x] + Simp[1/(d*f
^2*(m + 1))   Int[(f*x)^(m + 2)*(d + e*x^2)^q*ExpandToSum[d*f*(m + 1)*(Qx/x
) - e*R*(m + 2*q + 3), x], x], x]] /; FreeQ[{a, b, c, d, e, f, q}, x] && Ne
Q[b^2 - 4*a*c, 0] && IGtQ[p, 0] && LtQ[m, -1]
```

rule 2336
```
Int[(Pq_)*((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> With[
{Q = PolynomialQuotient[(c*x)^m*Pq, a + b*x^2, x], f = Coeff[PolynomialRema
inder[(c*x)^m*Pq, a + b*x^2, x], x, 0], g = Coeff[PolynomialRemainder[(c*x)
^m*Pq, a + b*x^2, x], x, 1]}, Simp[(a*g - b*f*x)*((a + b*x^2)^(p + 1)/(2*a*
b*(p + 1))), x] + Simp[1/(2*a*(p + 1))   Int[(c*x)^m*(a + b*x^2)^(p + 1)*Ex
pandToSum[(2*a*(p + 1)*Q)/(c*x)^m + (f*(2*p + 3))/(c*x)^m, x], x], x]] /; F
reeQ[{a, b, c}, x] && PolyQ[Pq, x] && LtQ[p, -1] && ILtQ[m, 0]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.308. $\int \frac{a+b\log(cx^n)}{x^4(d+ex^2)^{5/2}}\,dx$

3.308.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{4}\left(e\,x^{2}+d\right)^{\frac{5}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(5/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^4/(e*x^2+d)^(5/2),x)
```

3.308.5 Fricas [A] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 520, normalized size of antiderivative = 2.26

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{4}\left(d+ex^{2}\right)^{5/2}}\,dx = \left[\frac{24\left(be^{3}nx^{7}+2\,bde^{2}nx^{5}+bd^{2}enx^{3}\right)\sqrt{e}\log\left(-2\,ex^{2}+2\,\sqrt{ex^{2}+d}\sqrt{e}x-d\right)+\left(4\left(5\,b\right.\right.}{}\right.$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(5/2),x, algorithm="fricas")
```

output
```
[1/9*(24*(b*e^3*n*x^7 + 2*b*d*e^2*n*x^5 + b*d^2*e*n*x^3)*sqrt(e)*log(-2*e*
x^2 + 2*sqrt(e*x^2 + d)*sqrt(e)*x - d) + (4*(5*b*e^3*n + 12*a*e^3)*x^6 - b
*d^3*n + 6*(7*b*d*e^2*n + 12*a*d*e^2)*x^4 - 3*a*d^3 + 3*(7*b*d^2*e*n + 6*a
*d^2*e)*x^2 + 3*(16*b*e^3*x^6 + 24*b*d*e^2*x^4 + 6*b*d^2*e*x^2 - b*d^3)*lo
g(c) + 3*(16*b*e^3*n*x^6 + 24*b*d*e^2*n*x^4 + 6*b*d^2*e*n*x^2 - b*d^3*n)*l
og(x))*sqrt(e*x^2 + d))/(d^4*e^2*x^7 + 2*d^5*e*x^5 + d^6*x^3), 1/9*(48*(b*
e^3*n*x^7 + 2*b*d*e^2*n*x^5 + b*d^2*e*n*x^3)*sqrt(-e)*arctan(sqrt(-e)*x/sq
rt(e*x^2 + d)) + (4*(5*b*e^3*n + 12*a*e^3)*x^6 - b*d^3*n + 6*(7*b*d*e^2*n
 + 12*a*d*e^2)*x^4 - 3*a*d^3 + 3*(7*b*d^2*e*n + 6*a*d^2*e)*x^2 + 3*(16*b*e^
3*x^6 + 24*b*d*e^2*x^4 + 6*b*d^2*e*x^2 - b*d^3)*log(c) + 3*(16*b*e^3*n*x^6
 + 24*b*d*e^2*n*x^4 + 6*b*d^2*e*n*x^2 - b*d^3*n)*log(x))*sqrt(e*x^2 + d))/
(d^4*e^2*x^7 + 2*d^5*e*x^5 + d^6*x^3)]
```

3.308.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx=\text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(e*x**2+d)**(5/2),x)
```

output
```
Timed out
```

3.308.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx=\text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(5/2),x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.308.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^2+d\right)^{\frac{5}{2}}x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(e*x^2+d)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^2 + d)^(5/2)*x^4), x)
```

3.308.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^4\left(d+ex^2\right)^{5/2}}\,dx = \int \frac{a+b\,\ln\left(c\,x^n\right)}{x^4\left(e\,x^2+d\right)^{5/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(5/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x^2)^(5/2)), x)
```

3.309 $\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$

3.309.1 Optimal result

Integrand size = 33, antiderivative size = 251

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{2bd^2n(d^2-e^2x^2)}{3e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{bn(d^2-e^2x^2)^2}{9e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{2bd^4n\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{3e^4\sqrt{d-ex}\sqrt{d+ex}} - \frac{d^2(d^2-e^2x^2)(a+b\log(cx^n))}{e^4\sqrt{d-ex}\sqrt{d+ex}} + \frac{(d^2-e^2x^2)^2(a+b\log(cx^n))}{3e^4\sqrt{d-ex}\sqrt{d+ex}}$$

output
```
2/3*b*d^2*n*(-e^2*x^2+d^2)/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/9*b*n*(-e^2*
x^2+d^2)^2/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-d^2*(-e^2*x^2+d^2)*(a+b*ln(c*x
^n))/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/3*(-e^2*x^2+d^2)^2*(a+b*ln(c*x^n))
/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-2/3*b*d^4*n*arctanh((1-e^2*x^2/d^2)^(1/2
))*(1-e^2*x^2/d^2)^(1/2)/e^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

3.309.2 Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 163, normalized size of antiderivative = 0.65

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{-6bd^3n\log(x)+3bn\sqrt{d-ex}\sqrt{d+ex}(2d^2+e^2x^2)\log(x)+\sqrt{d-ex}\sqrt{d+ex}(e^2x^2(3a-bn-3bn\log(}{9e^4}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
-1/9*(-6*b*d^3*n*Log[x] + 3*b*n*Sqrt[d - e*x]*Sqrt[d + e*x]*(2*d^2 + e^2*x
^2)*Log[x] + Sqrt[d - e*x]*Sqrt[d + e*x]*(e^2*x^2*(3*a - b*n - 3*b*n*Log[x
] + 3*b*Log[c*x^n]) + d^2*(6*a - 5*b*n - 6*b*n*Log[x] + 6*b*Log[c*x^n])) +
 6*b*d^3*n*Log[d + Sqrt[d - e*x]*Sqrt[d + e*x]])/e^4
```

3.309.3 Rubi [A] (verified)

Time = 0.70 (sec) , antiderivative size = 192, normalized size of antiderivative = 0.76, number of steps used = 9, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}} = 0.242$, Rules used = {2787, 2792, 27, 354, 90, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \text{2787}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{x^3(a+b\log(cx^n))}{\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{2792}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-bn\int -\frac{d^2(2d^2+e^2x^2)\sqrt{1-\frac{e^2x^2}{d^2}}}{3e^4x}dx+\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^4}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{27}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\int\frac{\left(2d^2+e^2x^2\right)\sqrt{1-\frac{e^2x^2}{d^2}}}{x}dx}{3e^4}+\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^4}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\Big\downarrow$ 354

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\int\frac{\left(2d^2+e^2x^2\right)\sqrt{1-\frac{e^2x^2}{d^2}}}{x^2}dx^2}{6e^4}+\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^4}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\Big\downarrow$ 90

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\left(2d^2\int\frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x^2}dx^2-\frac{2}{3}d^2\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}\right)}{6e^4}+\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^4}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\Big\downarrow$ 60

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\left(2d^2\left(\int\frac{1}{x^2\sqrt{1-\frac{e^2x^2}{d^2}}}dx^2+2\sqrt{1-\frac{e^2x^2}{d^2}}\right)-\frac{2}{3}d^2\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}\right)}{6e^4}+\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log \cdots}{e^4}\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\Big\downarrow$ 73

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\left(2d^2\left(2\sqrt{1-\frac{e^2x^2}{d^2}}-\frac{2d^2\int\frac{1}{\frac{d^2}{e^2}-\frac{d^2x^4}{e^2}}d\sqrt{1-\frac{e^2x^2}{d^2}}}{e^2}\right)-\frac{2}{3}d^2\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}\right)}{6e^4}+\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}\cdots}{}\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\Big\downarrow$ 221

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d^4\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}(a+b\log(cx^n))}{3e^4}-\frac{d^4\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^4}+\frac{bd^2n\left(2d^2\left(2\sqrt{1-\frac{e^2x^2}{d^2}}-2\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\right)-\frac{2}{3}d^2\left(1-\cdots\right.\right.}{6e^4}\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

3.309. $\int\frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}dx$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*((b*d^2*n*((-2*d^2*(1 - (e^2*x^2)/d^2)^(3/2))/3 +
 2*d^2*(2*Sqrt[1 - (e^2*x^2)/d^2] - 2*ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]])))/
(6*e^4) - (d^4*Sqrt[1 - (e^2*x^2)/d^2]*(a + b*Log[c*x^n]))/e^4 + (d^4*(1 -
 (e^2*x^2)/d^2)^(3/2)*(a + b*Log[c*x^n]))/(3*e^4)))/(Sqrt[d - e*x]*Sqrt[d
+ e*x])
```

3.309.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 90
```
Int[((a_.) + (b_.)*(x_))*((c_.) + (d_.)*(x_))^(n_.)*((e_.) + (f_.)*(x_))^(p
_.), x_] :> Simp[b*(c + d*x)^(n + 1)*((e + f*x)^(p + 1)/(d*f*(n + p + 2))),
 x] + Simp[(a*d*f*(n + p + 2) - b*(d*e*(n + 1) + c*f*(p + 1)))/(d*f*(n + p
+ 2))   Int[(c + d*x)^n*(e + f*x)^p, x], x] /; FreeQ[{a, b, c, d, e, f, n,
p}, x] && NeQ[n + p + 2, 0]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 354
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2)^(q_.), x_S
ymbol] :> Simp[1/2   Subst[Int[x^((m - 1)/2)*(a + b*x)^p*(c + d*x)^q, x], x
, x^2], x] /; FreeQ[{a, b, c, d, p, q}, x] && NeQ[b*c - a*d, 0] && IntegerQ
[(m - 1)/2]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.309.4 Maple [F]

$$\int \frac{x^3(a+b\ln(c\,x^n))}{\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

3.309.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.50

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{6\,bd^3n\log\left(\frac{\sqrt{ex+d}\sqrt{-ex+d}-d}{x}\right)+(5\,bd^2n-6\,ad^2+(be^2n-3\,ae^2)x^2-3\,(be^2x^2+2\,bd^2)\log(c)-3\,(be^2nx^2+}{9\,e^4}$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
fricas")
```

output
```
1/9*(6*b*d^3*n*log((sqrt(e*x + d)*sqrt(-e*x + d) - d)/x) + (5*b*d^2*n - 6*
a*d^2 + (b*e^2*n - 3*a*e^2)*x^2 - 3*(b*e^2*x^2 + 2*b*d^2)*log(c) - 3*(b*e^
2*n*x^2 + 2*b*d^2*n)*log(x))*sqrt(e*x + d)*sqrt(-e*x + d))/e^4
```

3.309.6 Sympy [F]

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))/(sqrt(d - e*x)*sqrt(d + e*x)), x)
```

3.309.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 199, normalized size of antiderivative = 0.79

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{1}{9}bn\left(\frac{3\,d^3\log\left(d+\sqrt{-e^2x^2+d^2}\right)}{e^4} - \frac{3\,d^3\log\left(-d+\sqrt{-e^2x^2+d^2}\right)}{e^4} - \frac{6\sqrt{-e^2x^2+d^2}d^2-(-e^2x^2+d^2)}{e^4} \right. \\ - \frac{1}{3}b\left(\frac{\sqrt{-e^2x^2+d^2}x^2}{e^2} + \frac{2\sqrt{-e^2x^2+d^2}d^2}{e^4}\right)\log(cx^n) \\ - \frac{1}{3}a\left(\frac{\sqrt{-e^2x^2+d^2}x^2}{e^2} + \frac{2\sqrt{-e^2x^2+d^2}d^2}{e^4}\right)$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
maxima")
```

output
```
-1/9*b*n*(3*d^3*log(d + sqrt(-e^2*x^2 + d^2))/e^4 - 3*d^3*log(-d + sqrt(-e
^2*x^2 + d^2))/e^4 - (6*sqrt(-e^2*x^2 + d^2)*d^2 - (-e^2*x^2 + d^2)^(3/2))
/e^4) - 1/3*b*(sqrt(-e^2*x^2 + d^2)*x^2/e^2 + 2*sqrt(-e^2*x^2 + d^2)*d^2/e
^4)*log(c*x^n) - 1/3*a*(sqrt(-e^2*x^2 + d^2)*x^2/e^2 + 2*sqrt(-e^2*x^2 + d
^2)*d^2/e^4)
```

3.309.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(sqrt(e*x + d)*sqrt(-e*x + d)), x)
```

3.309.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{x^3\,(a+b\,\ln(c\,x^n))}{\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.310 $\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$

3.310.1 Optimal result

Integrand size = 31, antiderivative size = 148

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{bn(d^2-e^2x^2)}{e^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{bd^2n\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{e^2\sqrt{d-ex}\sqrt{d+ex}} - \frac{(d^2-e^2x^2)(a+b\log(cx^n))}{e^2\sqrt{d-ex}\sqrt{d+ex}}$$

output
```
b*n*(-e^2*x^2+d^2)/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-(-e^2*x^2+d^2)*(a+b*ln
(c*x^n))/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-b*d^2*n*arctanh((1-e^2*x^2/d^2)^
(1/2))*(1-e^2*x^2/d^2)^(1/2)/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

3.310.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.76

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{bdn\log(x)}{e^2} - \frac{bn\sqrt{d-ex}\sqrt{d+ex}\log(x)}{e^2} - \frac{\sqrt{d-ex}\sqrt{d+ex}(a-bn+b(-n\log(x)+\log(cx^n)))}{e^2} - \frac{bdn\log\left(d+\sqrt{d-ex}\sqrt{d+ex}\right)}{e^2}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(b*d*n*Log[x])/e^2 - (b*n*Sqrt[d - e*x]*Sqrt[d + e*x]*Log[x])/e^2 - (Sqrt[
d - e*x]*Sqrt[d + e*x]*(a - b*n + b*(-(n*Log[x]) + Log[c*x^n])))/e^2 - (b*
d*n*Log[d + Sqrt[d - e*x]*Sqrt[d + e*x]])/e^2
```

3.310.3 Rubi [A] (verified)

Time = 0.50 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.84, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.194, Rules used = {2787, 2776, 243, 60, 73, 221}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}dx$$

$$\Big\downarrow \ 2787$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{x(a+b\log(cx^n))}{\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \ 2776$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\int \frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x}dx}{e^2}-\frac{d^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \ 243$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\int \frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x^2}dx^2}{2e^2}-\frac{d^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \ 60$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\left(\int \frac{1}{x^2\sqrt{1-\frac{e^2x^2}{d^2}}}dx^2+2\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{2e^2}-\frac{d^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{73}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\left(2\sqrt{1-\frac{e^2x^2}{d^2}}-\frac{2d^2\int\frac{1}{\frac{d^2}{e^2}-\frac{d^2x^4}{e^2}}d\sqrt{1-\frac{e^2x^2}{d^2}}}{e^2}\right)}{2e^2}-\frac{d^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{221}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\left(2\sqrt{1-\frac{e^2x^2}{d^2}}-2\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\right)}{2e^2}-\frac{d^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*((b*d^2*n*(2*Sqrt[1 - (e^2*x^2)/d^2] - 2*ArcTanh[
Sqrt[1 - (e^2*x^2)/d^2]]))/(2*e^2) - (d^2*Sqrt[1 - (e^2*x^2)/d^2]*(a + b*L
og[c*x^n]))/e^2))/(Sqrt[d - e*x]*Sqrt[d + e*x])
```

3.310.3.1 Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 221
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[-a/b, 2]/a)*ArcTanh[x
/Rt[-a/b, 2]], x] /; FreeQ[{a, b}, x] && NegQ[a/b]
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

3.310.4 Maple [F]

$$\int \frac{x(a+b\ln(c\,x^{n}))}{\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

3.310.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 66, normalized size of antiderivative = 0.45

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{bdn\log\left(\frac{\sqrt{ex+d}\sqrt{-ex+d}-d}{x}\right)-(bn\log(x)-bn+b\log(c)+a)\sqrt{ex+d}\sqrt{-ex+d}}{e^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="fr
icas")
```

output
```
(b*d*n*log((sqrt(e*x + d)*sqrt(-e*x + d) - d)/x) - (b*n*log(x) - b*n + b*l
og(c) + a)*sqrt(e*x + d)*sqrt(-e*x + d))/e^2
```

3.310.6 Sympy [F]

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Integral(x*(a + b*log(c*x**n))/(sqrt(d - e*x)*sqrt(d + e*x)), x)
```

3.310.7 Maxima [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 105, normalized size of antiderivative = 0.71

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{\left(d\log\left(\frac{2d^2}{|x|}+\frac{2\sqrt{-e^2x^2+d^2}d}{|x|}\right)-\sqrt{-e^2x^2+d^2}\right)bn}{e^2} - \frac{\sqrt{-e^2x^2+d^2}b\log(cx^n)}{e^2} - \frac{\sqrt{-e^2x^2+d^2}a}{e^2}$$

input
```
integrate(x*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="ma
xima")
```

output
```
-(d*log(2*d^2/abs(x) + 2*sqrt(-e^2*x^2 + d^2)*d/abs(x)) - sqrt(-e^2*x^2 +
d^2))*b*n/e^2 - sqrt(-e^2*x^2 + d^2)*b*log(c*x^n)/e^2 - sqrt(-e^2*x^2 + d^
2)*a/e^2
```

3.310.8 Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{(b\log(cx^n)+a)x}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="gi
ac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(sqrt(e*x + d)*sqrt(-e*x + d)), x)
```

3.310.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((x*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.311 $\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx$

3.311.1 Optimal result

Integrand size = 33, antiderivative size = 301

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{2\sqrt{d-ex}\sqrt{d+ex}} - \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}} - \frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\log\left(\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{\sqrt{d-ex}\sqrt{d+ex}} - \frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{PolyLog}\left(2,-\frac{1+\sqrt{1-\frac{e^2x^2}{d^2}}}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{2\sqrt{d-ex}\sqrt{d+ex}}$$

output
```
1/2*b*n*arctanh((1-e^2*x^2/d^2)^(1/2))^2*(1-e^2*x^2/d^2)^(1/2)/(-e*x+d)^(1
/2)/(e*x+d)^(1/2)-arctanh((1-e^2*x^2/d^2)^(1/2))*(a+b*ln(c*x^n))*(1-e^2*x^
2/d^2)^(1/2)/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-b*n*arctanh((1-e^2*x^2/d^2)^(1/2
))*ln(2/(1-(1-e^2*x^2/d^2)^(1/2)))*(1-e^2*x^2/d^2)^(1/2)/(-e*x+d)^(1/2)/(e
*x+d)^(1/2)-1/2*b*n*polylog(2,(-1-(1-e^2*x^2/d^2)^(1/2))/(1-(1-e^2*x^2/d^2
)^(1/2)))*(1-e^2*x^2/d^2)^(1/2)/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

3.311.2 Mathematica [A] (verified)

Time = 1.20 (sec) , antiderivative size = 310, normalized size of antiderivative = 1.03

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{\log(x)\left(a-bn\log(x)+b\log(cx^n)\right)}{d} - \frac{\left(a-bn\log(x)+b\log(cx^n)\right)\log\left(d+\sqrt{d-ex}\sqrt{d+ex}\right)}{d} + \frac{bn\sqrt{-d^2+e^2x^2}\left(-\frac{4\operatorname{arctanh}\left(\frac{\sqrt{-d^2+e^2x^2}}{\sqrt{-d^2}}\right)\left(2\log(x)-\log\left(\frac{e^2x^2}{d^2}\right)\right)}{\sqrt{-d^2}} + \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\log^2\left(\frac{e^2x^2}{d^2}\right)-4\log\left(\frac{e^2x^2}{d^2}\right)\log\left(\frac{1}{2}\left(1+\sqrt{1-\frac{e^2x^2}{d^2}}\right.\right.\right.}{}\right.}{8\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Log[x]*(a - b*n*Log[x] + b*Log[c*x^n]))/d - ((a - b*n*Log[x] + b*Log[c*x^
n])*Log[d + Sqrt[d - e*x]*Sqrt[d + e*x]])/d + (b*n*Sqrt[-d^2 + e^2*x^2]*((
-4*ArcTanh[Sqrt[-d^2 + e^2*x^2]/Sqrt[-d^2]]*(2*Log[x] - Log[(e^2*x^2)/d^2]
))/Sqrt[-d^2] + (Sqrt[1 - (e^2*x^2)/d^2]*(Log[(e^2*x^2)/d^2]^2 - 4*Log[(e^
2*x^2)/d^2]*Log[(1 + Sqrt[1 - (e^2*x^2)/d^2])/2] + 2*Log[(1 + Sqrt[1 - (e^
2*x^2)/d^2])/2]^2 - 4*PolyLog[2, 1/2 - Sqrt[1 - (e^2*x^2)/d^2]/2]))/Sqrt[-
d^2 + e^2*x^2]))/(8*Sqrt[d - e*x]*Sqrt[d + e*x])
```

3.311.3 Rubi [A] (verified)

Time = 1.10 (sec) , antiderivative size = 175, normalized size of antiderivative = 0.58, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.303$, Rules used = {2787, 2790, 25, 7282, 7267, 25, 6546, 6470, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \; 2787$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{x\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 2790$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-bn\int -\frac{\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{x}dx-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 25}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\int \frac{\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{x}dx-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 7282}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{1}{2}bn\int \frac{\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{x^2}dx^2-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 7267}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\int -\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{1-x^4}d\sqrt{1-\frac{e^2x^2}{d^2}}-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 25}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-bn\int \frac{\sqrt{1-\frac{e^2x^2}{d^2}}\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{1-x^4}d\sqrt{1-\frac{e^2x^2}{d^2}}-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 6546}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\left(\frac{1}{2}\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2-\int \frac{\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}d\sqrt{1-\frac{e^2x^2}{d^2}}\right)-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 6470}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\left(\int \frac{\log\left(\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{1-x^4}d\sqrt{1-\frac{e^2x^2}{d^2}}+\frac{1}{2}\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\log\left(\frac{2}{1-\sqrt{1-\frac{e^2}{d}}}\right)\right)\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

3.311. $\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx$

$$\Big\downarrow 2849$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\left(-\int \frac{\log\left(\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{1-\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}}d\frac{1}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}+\frac{1}{2}\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\log\left(\frac{2}{1-\sqrt{1-}}\right.\right.\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow 2752$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\left(\frac{1}{2}\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2-\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\log\left(\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2}{1-\sqrt{1-}}\right.\right.\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(a + b*Log[c*x^n])/(x*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*(-(ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]]*(a + b*Log[c*
x^n])) + b*n*(ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]]^2/2 - ArcTanh[Sqrt[1 - (e^2
*x^2)/d^2]]*Log[2/(1 - Sqrt[1 - (e^2*x^2)/d^2])] - PolyLog[2, 1 - 2/(1 - S
qrt[1 - (e^2*x^2)/d^2])]/2)))/(Sqrt[d - e*x]*Sqrt[d + e*x])
```

3.311.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

3.311. $\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx$

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

rule 7282
```
Int[(u_)/(x_), x_Symbol] :> With[{lst = PowerVariableExpn[u, 0, x]}, Simp[1
/lst[[2]]   Subst[Int[NormalizeIntegrand[Simplify[lst[[1]]/x], x], x], x, (
lst[[3]]*x)^lst[[2]]], x] /;  !FalseQ[lst] && NeQ[lst[[2]], 0]] /; NonsumQ[
u] &&  !RationalFunctionQ[u, x]
```

3.311. $\int \frac{a+b\log(cx^n)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx$

3.311.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

3.311.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\sqrt{ex+d}\sqrt{-ex+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="fr
icas")
```

output
```
integral(-(sqrt(e*x + d)*sqrt(-e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*sqrt(
-e*x + d)*a)/(e^2*x^3 - d^2*x), x)
```

3.311.6 Sympy [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{a+b\log\left(cx^{n}\right)}{x\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*sqrt(d - e*x)*sqrt(d + e*x)), x)
```

3.311.7 Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x\sqrt{d - ex}\sqrt{d + ex}}\,dx = \int \frac{b\log(cx^n) + a}{\sqrt{ex + d}\sqrt{-ex + dx}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="ma
xima")
```

output
```
b*integrate((log(c) + log(x^n))/(sqrt(e*x + d)*sqrt(-e*x + d)*x), x) - a*l
og(2*d^2/abs(x) + 2*sqrt(-e^2*x^2 + d^2)*d/abs(x))/d
```

3.311.8 Giac [F]

$$\int \frac{a + b\log(cx^n)}{x\sqrt{d - ex}\sqrt{d + ex}}\,dx = \int \frac{b\log(cx^n) + a}{\sqrt{ex + d}\sqrt{-ex + dx}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="gi
ac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*sqrt(-e*x + d)*x), x)
```

3.311.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{x\sqrt{d - ex}\sqrt{d + ex}}\,dx = \int \frac{a + b\ln(c\,x^n)}{x\,\sqrt{d + e\,x}\,\sqrt{d - e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.312 $\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx$

3.312.1 Optimal result

Integrand size = 33, antiderivative size = 489

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx &= -\frac{bn(d^2-e^2x^2)}{4d^2x^2\sqrt{d-ex}\sqrt{d+ex}}\\
&\quad+\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)}{4d^2\sqrt{d-ex}\sqrt{d+ex}}\\
&\quad+\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{4d^2\sqrt{d-ex}\sqrt{d+ex}}\\
&\quad-\frac{(d^2-e^2x^2)(a+b\log(cx^n))}{2d^2x^2\sqrt{d-ex}\sqrt{d+ex}}\\
&\quad-\frac{e^2\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))}{2d^2\sqrt{d-ex}\sqrt{d+ex}}\\
&\quad-\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)\log\left(\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{2d^2\sqrt{d-ex}\sqrt{d+ex}}\\
&\quad-\frac{be^2n\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{PolyLog}\left(2,-\frac{1+\sqrt{1-\frac{e^2x^2}{d^2}}}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right)}{4d^2\sqrt{d-ex}\sqrt{d+ex}}\end{aligned}$$

output
```
-1/4*b*n*(-e^2*x^2+d^2)/d^2/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/2*(-e^2*x^2
+d^2)*(a+b*ln(c*x^n))/d^2/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/4*b*e^2*n*arc
tanh((1-e^2*x^2/d^2)^(1/2))*(1-e^2*x^2/d^2)^(1/2)/d^2/(-e*x+d)^(1/2)/(e*x+
d)^(1/2)+1/4*b*e^2*n*arctanh((1-e^2*x^2/d^2)^(1/2))^2*(1-e^2*x^2/d^2)^(1/2
)/d^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/2*e^2*arctanh((1-e^2*x^2/d^2)^(1/2))*
(a+b*ln(c*x^n))*(1-e^2*x^2/d^2)^(1/2)/d^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/2
*b*e^2*n*arctanh((1-e^2*x^2/d^2)^(1/2))*ln(2/(1-(1-e^2*x^2/d^2)^(1/2)))*(1
-e^2*x^2/d^2)^(1/2)/d^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/4*b*e^2*n*polylog(2
,(-1-(1-e^2*x^2/d^2)^(1/2))/(1-(1-e^2*x^2/d^2)^(1/2)))*(1-e^2*x^2/d^2)^(1/
2)/d^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

3.312.2 Mathematica [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4 in optimal.

Time = 0.64 (sec) , antiderivative size = 255, normalized size of antiderivative = 0.52

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{\frac{bn(-d^2+e^2x^2)\left(2d^3\,{}_3F_2\left(\frac{3}{2},\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};\frac{d^2}{e^2x^2}\right)+9e^2x^2\left(d\sqrt{1-\frac{d^2}{e^2x^2}}-ex\arcsin\left(\frac{d}{ex}\right)\right)(1+2\log(x))\right)}{e^2\sqrt{1-\frac{d^2}{e^2x^2}}x^4\sqrt{d-ex}\sqrt{d+ex}}-\frac{18d\sqrt{d-ex}\sqrt{d+ex}(a-bn\log(x)+b\log(cx^n}{x^2}}{3}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
((b*n*(-d^2 + e^2*x^2)*(2*d^3*HypergeometricPFQ[{3/2, 3/2, 3/2}, {5/2, 5/2
}, d^2/(e^2*x^2)] + 9*e^2*x^2*(d*Sqrt[1 - d^2/(e^2*x^2)] - e*x*ArcSin[d/(e
*x)])*(1 + 2*Log[x])))/(e^2*Sqrt[1 - d^2/(e^2*x^2)]*x^4*Sqrt[d - e*x]*Sqrt
[d + e*x]) - (18*d*Sqrt[d - e*x]*Sqrt[d + e*x]*(a - b*n*Log[x] + b*Log[c*x
^n]))/x^2 + 18*e^2*Log[x]*(a - b*n*Log[x] + b*Log[c*x^n]) - 18*e^2*(a - b*
n*Log[x] + b*Log[c*x^n])*Log[d + Sqrt[d - e*x]*Sqrt[d + e*x]])/(36*d^3)
```

3.312.3 Rubi [A] (verified)

Time = 1.00 (sec) , antiderivative size = 307, normalized size of antiderivative = 0.63, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2787, 2792, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3\sqrt{d-ex}\sqrt{d+ex}}dx$$

$$\Big\downarrow \ \color{blue}{2787}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{x^3\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \ \color{blue}{2792}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-bn\int \left(-\frac{\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)e^2}{2d^2x}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{2x^3}\right)dx-\frac{e^2\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))}{2d^2}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log}{2x^2}\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \ \color{blue}{2009}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-\frac{e^2\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)(a+b\log(cx^n))}{2d^2}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{2x^2}-bn\left(-\frac{e^2\text{arctanh}\left(\sqrt{1-\frac{e^2x^2}{d^2}}\right)^2}{4d^2}-\frac{e^2\text{arctanh}}{}\right.\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*(-1/2*(Sqrt[1 - (e^2*x^2)/d^2]*(a + b*Log[c*x^n])
)/x^2 - (e^2*ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]]*(a + b*Log[c*x^n]))/(2*d^2)
- b*n*(Sqrt[1 - (e^2*x^2)/d^2]/(4*x^2) - (e^2*ArcTanh[Sqrt[1 - (e^2*x^2)/d
^2]])/(4*d^2) - (e^2*ArcTanh[Sqrt[1 - (e^2*x^2)/d^2]]^2)/(4*d^2) + (e^2*Ar
cTanh[Sqrt[1 - (e^2*x^2)/d^2]]*Log[2/(1 - Sqrt[1 - (e^2*x^2)/d^2])])/(2*d^
2) + (e^2*PolyLog[2, -((1 + Sqrt[1 - (e^2*x^2)/d^2])/(1 - Sqrt[1 - (e^2*x^
2)/d^2]))])/(4*d^2))))/(Sqrt[d - e*x]*Sqrt[d + e*x])
```

3.312.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.312.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{3}\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

3.312.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x^{3}\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\sqrt{ex+d}\sqrt{-ex+d}x^{3}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
fricas")
```

output
```
integral(-(sqrt(e*x + d)*sqrt(-e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*sqrt(
-e*x + d)*a)/(e^2*x^5 - d^2*x^3), x)
```

3.312.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Timed out
```

3.312.7 Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\sqrt{ex+d}\sqrt{-ex+d}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
maxima")
```

output
```
-1/2*a*(e^2*log(2*d^2/abs(x) + 2*sqrt(-e^2*x^2 + d^2)*d/abs(x))/d^3 + sqrt
(-e^2*x^2 + d^2)/(d^2*x^2)) + b*integrate((log(c) + log(x^n))/(sqrt(e*x +
d)*sqrt(-e*x + d)*x^3), x)
```

3.312.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\sqrt{ex+d}\sqrt{-ex+d}x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*sqrt(-e*x + d)*x^3), x)
```

3.312.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\sqrt{d-ex}\sqrt{d+ex}}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.313 $\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$

3.313.1 Optimal result

Integrand size = 33, antiderivative size = 406

$$\begin{aligned}\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx &= \frac{bnx(d^2-e^2x^2)}{4e^2\sqrt{d-ex}\sqrt{d+ex}} + \frac{bd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)}{4e^3\sqrt{d-ex}\sqrt{d+ex}} \\ &+ \frac{ibd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)^2}{4e^3\sqrt{d-ex}\sqrt{d+ex}} \\ &- \frac{bd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)}{2e^3\sqrt{d-ex}\sqrt{d+ex}} \\ &- \frac{x(d^2-e^2x^2)(a+b\log(cx^n))}{2e^2\sqrt{d-ex}\sqrt{d+ex}} \\ &+ \frac{d^3\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3\sqrt{d-ex}\sqrt{d+ex}} \\ &+ \frac{ibd^3n\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{PolyLog}\left(2,e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)}{4e^3\sqrt{d-ex}\sqrt{d+ex}}\end{aligned}$$

output
```
1/4*b*n*x*(-e^2*x^2+d^2)/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/2*x*(-e^2*x^2+
d^2)*(a+b*ln(c*x^n))/e^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/4*b*d^3*n*arcsin(e
*x/d)*(1-e^2*x^2/d^2)^(1/2)/e^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/4*I*b*d^3*n
*arcsin(e*x/d)^2*(1-e^2*x^2/d^2)^(1/2)/e^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/
2*b*d^3*n*arcsin(e*x/d)*ln(1-(I*e*x/d+(1-e^2*x^2/d^2)^(1/2))^2)*(1-e^2*x^2
/d^2)^(1/2)/e^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/2*d^3*arcsin(e*x/d)*(a+b*ln
(c*x^n))*(1-e^2*x^2/d^2)^(1/2)/e^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/4*I*b*d^
3*n*polylog(2,(I*e*x/d+(1-e^2*x^2/d^2)^(1/2))^2)*(1-e^2*x^2/d^2)^(1/2)/e^3
/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

3.313.2 Mathematica [A] (verified)

Time = 1.88 (sec) , antiderivative size = 316, normalized size of antiderivative = 0.78

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

$$= \frac{-2ex\sqrt{d-ex}\sqrt{d+ex}(a-bn\log(x)+b\log(cx^n))+2d^2\arctan\left(\frac{ex}{\sqrt{d-ex}\sqrt{d+ex}}\right)(a-bn\log(x)+b\log(cx^n}{}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(-2*e*x*Sqrt[d - e*x]*Sqrt[d + e*x]*(a - b*n*Log[x] + b*Log[c*x^n]) + 2*d^
2*ArcTan[(e*x)/(Sqrt[d - e*x]*Sqrt[d + e*x])]*(a - b*n*Log[x] + b*Log[c*x^
n]) + (b*n*(d^3*Sqrt[1 - (e^2*x^2)/d^2]*ArcSin[(e*x)/d] + e*x*(-d^2 + e^2*
x^2)*(-1 + 2*Log[x]) + (e^3*Sqrt[1 - (e^2*x^2)/d^2]*(ArcSinh[Sqrt[-(e^2/d^
2)]*x]^2 + 2*ArcSinh[Sqrt[-(e^2/d^2)]*x]*Log[1 - E^(-2*ArcSinh[Sqrt[-(e^2/
d^2)]*x])] - 2*Log[x]*Log[Sqrt[-(e^2/d^2)]*x + Sqrt[1 - (e^2*x^2)/d^2]] -
PolyLog[2, E^(-2*ArcSinh[Sqrt[-(e^2/d^2)]*x])]))/(-(e^2/d^2))^(3/2)))/(Sqr
t[d - e*x]*Sqrt[d + e*x]))/(4*e^3)
```

3.313.3 Rubi [A] (verified)

Time = 0.82 (sec) , antiderivative size = 217, normalized size of antiderivative = 0.53, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.152$, Rules used = {2787, 2792, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \; 2787$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{x^2(a+b\log(cx^n))}{\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 2792$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-bn\int -\frac{d^2\left(ex\sqrt{\frac{d^2-e^2x^2}{d^2}}-d\arcsin\left(\frac{ex}{d}\right)\right)}{2e^3x}dx+\frac{d^3\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3}-\frac{d^2x\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{2e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 27$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\int \frac{ex\sqrt{\frac{d^2-e^2x^2}{d^2}}-d\arcsin\left(\frac{ex}{d}\right)}{x}dx}{2e^3}+\frac{d^3\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3}-\frac{d^2x\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{2e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 2010$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bd^2n\int \left(e\sqrt{1-\frac{e^2x^2}{d^2}}-\frac{d\arcsin\left(\frac{ex}{d}\right)}{x}\right)dx}{2e^3}+\frac{d^3\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3}-\frac{d^2x\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{2e^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 2009$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d^3\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{2e^3}-\frac{d^2x\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{2e^2}+\frac{bd^2n\left(\frac{1}{2}id\,\text{PolyLog}\left(2,e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)+\frac{1}{2}id\arcsin\left(\frac{ex}{d}\right)^2+\frac{1}{2}d\,\text{ar}\ldots\right.}{2\ldots}\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*(-1/2*(d^2*x*Sqrt[1 - (e^2*x^2)/d^2]*(a + b*Log[c
*x^n]))/e^2 + (d^3*ArcSin[(e*x)/d]*(a + b*Log[c*x^n]))/(2*e^3) + (b*d^2*n*
((e*x*Sqrt[1 - (e^2*x^2)/d^2])/2 + (d*ArcSin[(e*x)/d])/2 + (I/2)*d*ArcSin[
(e*x)/d]^2 - d*ArcSin[(e*x)/d]*Log[1 - E^((2*I)*ArcSin[(e*x)/d])] + (I/2)*
d*PolyLog[2, E^((2*I)*ArcSin[(e*x)/d])]))/(2*e^3)))/(Sqrt[d - e*x]*Sqrt[d
+ e*x])
```

3.313.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.313.4 Maple [F]

$$\int \frac{x^2(a+b\ln(c\,x^n))}{\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

3.313.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
fricas")
```

output
```
integral(-(sqrt(e*x + d)*sqrt(-e*x + d)*b*x^2*log(c*x^n) + sqrt(e*x + d)*s
qrt(-e*x + d)*a*x^2)/(e^2*x^2 - d^2), x)
```

3.313.6 Sympy [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \text{Timed out}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Timed out
```

3.313.7 Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
maxima")
```

output
```
1/2*a*(d^2*arcsin(e^2*x/(d*sqrt(e^2)))/(sqrt(e^2)*e^2) - sqrt(-e^2*x^2 + d
^2)*x/e^2) + b*integrate((x^2*log(c) + x^2*log(x^n))/(sqrt(e*x + d)*sqrt(-
e*x + d)), x)
```

3.313.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(sqrt(e*x + d)*sqrt(-e*x + d)), x)
```

3.313.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/((d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.314 $\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$

3.314.1 Optimal result

Integrand size = 30, antiderivative size = 248

$$\begin{aligned}\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx &= \frac{ibdn\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)^2}{2e\sqrt{d-ex}\sqrt{d+ex}} \\ &\quad - \frac{bdn\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)}{e\sqrt{d-ex}\sqrt{d+ex}} \\ &\quad + \frac{d\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e\sqrt{d-ex}\sqrt{d+ex}} \\ &\quad + \frac{ibdn\sqrt{1-\frac{e^2x^2}{d^2}}\operatorname{PolyLog}\left(2,e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)}{2e\sqrt{d-ex}\sqrt{d+ex}}\end{aligned}$$

output
```
1/2*I*b*d*n*arcsin(e*x/d)^2*(1-e^2*x^2/d^2)^(1/2)/e/(-e*x+d)^(1/2)/(e*x+d)
^(1/2)-b*d*n*arcsin(e*x/d)*ln(1-(I*e*x/d+(1-e^2*x^2/d^2)^(1/2))^2)*(1-e^2*
x^2/d^2)^(1/2)/e/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+d*arcsin(e*x/d)*(a+b*ln(c*x^
n))*(1-e^2*x^2/d^2)^(1/2)/e/(-e*x+d)^(1/2)/(e*x+d)^(1/2)+1/2*I*b*d*n*polyl
og(2,(I*e*x/d+(1-e^2*x^2/d^2)^(1/2))^2)*(1-e^2*x^2/d^2)^(1/2)/e/(-e*x+d)^(
1/2)/(e*x+d)^(1/2)
```

3.314.2 Mathematica [A] (verified)

Time = 0.38 (sec) , antiderivative size = 217, normalized size of antiderivative = 0.88

$$\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{\arctan\left(\frac{ex}{\sqrt{d-ex}\sqrt{d+ex}}\right)(a-bn\log(x)+b\log(cx^n))}{e} - \frac{bn\sqrt{1-\frac{e^2x^2}{d^2}}\left(\operatorname{arcsinh}\left(\sqrt{-\frac{e^2}{d^2}}x\right)^2+2\operatorname{arcsinh}\left(\sqrt{-\frac{e^2}{d^2}}x\right)\log\left(1-e^{-2\operatorname{arcsinh}\left(\sqrt{-\frac{e^2}{d^2}}x\right)}\right)-2\log(x)\log\left(\right.\right.}{2\sqrt{-\frac{e^2}{d^2}}\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Integrate[(a + b*Log[c*x^n])/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(ArcTan[(e*x)/(Sqrt[d - e*x]*Sqrt[d + e*x])]*(a - b*n*Log[x] + b*Log[c*x^n
]))/e - (b*n*Sqrt[1 - (e^2*x^2)/d^2]*(ArcSinh[Sqrt[-(e^2/d^2)]*x]^2 + 2*Ar
cSinh[Sqrt[-(e^2/d^2)]*x]*Log[1 - E^(-2*ArcSinh[Sqrt[-(e^2/d^2)]*x])] - 2*
Log[x]*Log[Sqrt[-(e^2/d^2)]*x + Sqrt[1 - (e^2*x^2)/d^2]] - PolyLog[2, E^(-
2*ArcSinh[Sqrt[-(e^2/d^2)]*x])]))/(2*Sqrt[-(e^2/d^2)]*Sqrt[d - e*x]*Sqrt[d
 + e*x])
```

3.314.3 Rubi [A] (verified)

Time = 0.64 (sec) , antiderivative size = 139, normalized size of antiderivative = 0.56, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {2765, 2763, 5136, 3042, 25, 4200, 25, 2620, 2715, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

$$\Big\downarrow \; 2765$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \; 2763$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\int\frac{\arcsin\left(\frac{ex}{d}\right)}{x}dx}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\downarrow$ 5136

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\int\frac{d\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)}{ex}d\arcsin\left(\frac{ex}{d}\right)}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\downarrow$ 3042

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\int-\arcsin\left(\frac{ex}{d}\right)\tan\left(\arcsin\left(\frac{ex}{d}\right)+\frac{\pi}{2}\right)d\arcsin\left(\frac{ex}{d}\right)}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\downarrow$ 25

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bdn\int\arcsin\left(\frac{ex}{d}\right)\tan\left(\arcsin\left(\frac{ex}{d}\right)+\frac{\pi}{2}\right)d\arcsin\left(\frac{ex}{d}\right)}{e}+\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\downarrow$ 4200

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\left(2i\int-\frac{e^{2i\arcsin\left(\frac{ex}{d}\right)}\arcsin\left(\frac{ex}{d}\right)}{1-e^{2i\arcsin\left(\frac{ex}{d}\right)}}d\arcsin\left(\frac{ex}{d}\right)-\frac{1}{2}i\arcsin\left(\frac{ex}{d}\right)^2\right)}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\downarrow$ 25

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\left(-2i\int\frac{e^{2i\arcsin\left(\frac{ex}{d}\right)}\arcsin\left(\frac{ex}{d}\right)}{1-e^{2i\arcsin\left(\frac{ex}{d}\right)}}d\arcsin\left(\frac{ex}{d}\right)-\frac{1}{2}i\arcsin\left(\frac{ex}{d}\right)^2\right)}{e}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\downarrow$ 2620

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\left(-2i\left(\frac{1}{2}i\arcsin\left(\frac{ex}{d}\right)\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)-\frac{1}{2}i\int\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)d\arcsin\left(\frac{ex}{d}\right)\right)-\frac{1}{2}i\ldots\right.}{e}\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\downarrow$ 2715

3.314. $\int\frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}dx$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\left(-2i\left(\frac{1}{2}i\arcsin\left(\frac{ex}{d}\right)\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)-\frac{1}{4}\int e^{-2i\arcsin\left(\frac{ex}{d}\right)}\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)de^{2i}\right.}{e}\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

$\downarrow$ 2838

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{d\arcsin\left(\frac{ex}{d}\right)(a+b\log(cx^n))}{e}-\frac{bdn\left(-2i\left(\frac{1}{4}\text{PolyLog}\left(2,e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)+\frac{1}{2}i\arcsin\left(\frac{ex}{d}\right)\log\left(1-e^{2i\arcsin\left(\frac{ex}{d}\right)}\right)\right)-\frac{1}{2}i\arcsin\left(\frac{ex}{d}\right)^2\right.}{e}\right.}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(a + b*Log[c*x^n])/(Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*((d*ArcSin[(e*x)/d]*(a + b*Log[c*x^n]))/e - (b*d*
n*((-1/2*I)*ArcSin[(e*x)/d]^2 - (2*I)*((I/2)*ArcSin[(e*x)/d]*Log[1 - E^((2
*I)*ArcSin[(e*x)/d])] + PolyLog[2, E^((2*I)*ArcSin[(e*x)/d])]/4)))/e))/(Sq
rt[d - e*x]*Sqrt[d + e*x])
```

3.314.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2620
```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m/(b*f*g*n*Log[F]))*Log[1 + b*((F^(g*(e + f*x)))^n/a)], x] - Si
mp[d*(m/(b*f*g*n*Log[F]))   Int[(c + d*x)^(m - 1)*Log[1 + b*((F^(g*(e + f*x
)))^n/a)], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

rule 2715
```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Simp[1/(d*e*n*Log[F])   Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x)
))^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

rule 2763
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/Sqrt[(d_) + (e_.)*(x_)^2], x_Symb
ol] :> Simp[ArcSin[Rt[-e, 2]*(x/Sqrt[d])]*((a + b*Log[c*x^n])/Rt[-e, 2]), x
] - Simp[b*(n/Rt[-e, 2])   Int[ArcSin[Rt[-e, 2]*(x/Sqrt[d])]/x, x], x] /; F
reeQ[{a, b, c, d, e, n}, x] && GtQ[d, 0] && NegQ[e]
```

rule 2765
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))/(Sqrt[(d1_) + (e1_.)*(x_)]*Sqrt[(
d2_) + (e2_.)*(x_)]), x_Symbol] :> Simp[Sqrt[1 + e1*(e2/(d1*d2))*x^2]/(Sqrt
[d1 + e1*x]*Sqrt[d2 + e2*x])   Int[(a + b*Log[c*x^n])/Sqrt[1 + e1*(e2/(d1*d
2))*x^2], x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2*e1 + d
1*e2, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 3042
```
Int[u_, x_Symbol] :> Int[DeactivateTrig[u, x], x] /; FunctionOfTrigOfLinear
Q[u, x]
```

rule 4200
```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[I*((c + d*x)^(m + 1)/(d*(m + 1))), x] - Simp[2*I   Int[(c + d*x)^
m*E^(2*I*k*Pi)*(E^(2*I*(e + f*x))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x)))), x]
, x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

rule 5136
```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n*Cot[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

3.314.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

3.314.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="fric
as")
```

output
```
integral(-(sqrt(e*x + d)*sqrt(-e*x + d)*b*log(c*x^n) + sqrt(e*x + d)*sqrt(
-e*x + d)*a)/(e^2*x^2 - d^2), x)
```

3.314.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(sqrt(d - e*x)*sqrt(d + e*x)), x)
```

3.314.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex+d}\sqrt{-ex+d}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="maxi
ma")
```

output
```
b*integrate((log(c) + log(x^n))/(sqrt(e*x + d)*sqrt(-e*x + d)), x) + a*arc
sin(e^2*x/(d*sqrt(e^2)))/sqrt(e^2)
```

3.314.8 Giac [F]

$$\int \frac{a + b\log\left(cx^n\right)}{\sqrt{d - ex}\sqrt{d + ex}}\,dx = \int \frac{b\log\left(cx^n\right) + a}{\sqrt{ex + d}\sqrt{-ex + d}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="giac
")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*sqrt(-e*x + d)), x)
```

3.314.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log\left(cx^n\right)}{\sqrt{d - ex}\sqrt{d + ex}}\,dx = \int \frac{a + b\,\ln\left(c\,x^n\right)}{\sqrt{d + e\,x}\,\sqrt{d - e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/((d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/((d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.315 $\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx$

3.315.1 Optimal result

Integrand size = 33, antiderivative size = 142

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{bn(d^2-e^2x^2)}{d^2x\sqrt{d-ex}\sqrt{d+ex}} - \frac{ben\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)}{d\sqrt{d-ex}\sqrt{d+ex}} - \frac{(d^2-e^2x^2)\left(a+b\log(cx^n)\right)}{d^2x\sqrt{d-ex}\sqrt{d+ex}}$$

output
```
-b*n*(-e^2*x^2+d^2)/d^2/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-(-e^2*x^2+d^2)*(a+b
*ln(c*x^n))/d^2/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-b*e*n*arcsin(e*x/d)*(1-e^2*
x^2/d^2)^(1/2)/d/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

3.315.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 70, normalized size of antiderivative = 0.49

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{benx\arctan\left(\frac{ex}{\sqrt{d-ex}\sqrt{d+ex}}\right)+\sqrt{d-ex}\sqrt{d+ex}(a+bn+b\log(cx^n))}{d^2x}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
-((b*e*n*x*ArcTan[(e*x)/(Sqrt[d - e*x]*Sqrt[d + e*x])] + Sqrt[d - e*x]*Sqr
t[d + e*x]*(a + b*n + b*Log[c*x^n]))/(d^2*x))
```

3.315.3 Rubi [A] (verified)

Time = 0.57 (sec) , antiderivative size = 109, normalized size of antiderivative = 0.77, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.121, Rules used = {2787, 2773, 247, 223}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{2787}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{x^2\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{2773}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\int \frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x^2}dx-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{x}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{247}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\left(-\frac{e^2\int \frac{1}{\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{d^2}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x}\right)-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{x}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{223}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(bn\left(-\frac{e\arcsin\left(\frac{ex}{d}\right)}{d}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x}\right)-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{x}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*(b*n*(-(Sqrt[1 - (e^2*x^2)/d^2]/x) - (e*ArcSin[(e
*x)/d])/d) - (Sqrt[1 - (e^2*x^2)/d^2]*(a + b*Log[c*x^n]))/x))/(Sqrt[d - e*
x]*Sqrt[d + e*x])
```

3.315.3.1 Defintions of rubi rules used

rule 223
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSin[Rt[-b, 2]*(x/Sqrt
[a])]/Rt[-b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && NegQ[b]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

3.315.4 Maple [F]

$$\int \frac{a+b\ln \left(c\,x^{n}\right)}{x^{2}\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

3.315.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 73, normalized size of antiderivative = 0.51

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{2\,benx\arctan\left(\frac{\sqrt{ex+d}\sqrt{-ex+d}-d}{ex}\right)-(bn\log(x)+bn+b\log(c)+a)\sqrt{ex+d}\sqrt{-ex+d}}{d^2x}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
fricas")
```

output
```
(2*b*e*n*x*arctan((sqrt(e*x + d)*sqrt(-e*x + d) - d)/(e*x)) - (b*n*log(x)
+ b*n + b*log(c) + a)*sqrt(e*x + d)*sqrt(-e*x + d))/(d^2*x)
```

3.315.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*sqrt(d - e*x)*sqrt(d + e*x)), x)
```

3.315.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 102, normalized size of antiderivative = 0.72

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{\left(\frac{e^2\arcsin\left(\frac{e^2x}{d\sqrt{e^2}}\right)}{\sqrt{e^2}}+\frac{\sqrt{-e^2x^2+d^2}}{x}\right)bn}{d^2} - \frac{\sqrt{-e^2x^2+d^2}\,b\log(cx^n)}{d^2x} - \frac{\sqrt{-e^2x^2+d^2}\,a}{d^2x}$$

input
```
integrate((a+b*log(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
maxima")
```

output
```
-(e^2*arcsin(e^2*x/(d*sqrt(e^2)))/sqrt(e^2) + sqrt(-e^2*x^2 + d^2)/x)*b*n/
d^2 - sqrt(-e^2*x^2 + d^2)*b*log(c*x^n)/(d^2*x) - sqrt(-e^2*x^2 + d^2)*a/(
d^2*x)
```

3.315.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex+d}\sqrt{-ex+d}x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*sqrt(-e*x + d)*x^2), x)
```

3.315.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^2\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.316 $\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx$

3.316.1 Optimal result

Integrand size = 33, antiderivative size = 252

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{2be^2n(d^2-e^2x^2)}{3d^4x\sqrt{d-ex}\sqrt{d+ex}} - \frac{bn(d^2-e^2x^2)^2}{9d^4x^3\sqrt{d-ex}\sqrt{d+ex}} - \frac{2be^3n\sqrt{1-\frac{e^2x^2}{d^2}}\arcsin\left(\frac{ex}{d}\right)}{3d^3\sqrt{d-ex}\sqrt{d+ex}} - \frac{(d^2-e^2x^2)(a+b\log(cx^n))}{3d^2x^3\sqrt{d-ex}\sqrt{d+ex}} - \frac{2e^2(d^2-e^2x^2)(a+b\log(cx^n))}{3d^4x\sqrt{d-ex}\sqrt{d+ex}}$$

output
```
-2/3*b*e^2*n*(-e^2*x^2+d^2)/d^4/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/9*b*n*(-e
^2*x^2+d^2)^2/d^4/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-1/3*(-e^2*x^2+d^2)*(a+b
*ln(c*x^n))/d^2/x^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-2/3*e^2*(-e^2*x^2+d^2)*(a
+b*ln(c*x^n))/d^4/x/(-e*x+d)^(1/2)/(e*x+d)^(1/2)-2/3*b*e^3*n*arcsin(e*x/d)
*(1-e^2*x^2/d^2)^(1/2)/d^3/(-e*x+d)^(1/2)/(e*x+d)^(1/2)
```

3.316.2 Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 116, normalized size of antiderivative = 0.46

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx = -\frac{6be^3nx^3\arctan\left(\frac{ex}{\sqrt{d-ex}\sqrt{d+ex}}\right)+\sqrt{d-ex}\sqrt{d+ex}(3a(d^2+2e^2x^2)+bn(d^2+5e^2x^2)+3b(d^2+2e^2x^2)\,\mathrm{lo}}{9d^4x^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^4*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
-1/9*(6*b*e^3*n*x^3*ArcTan[(e*x)/(Sqrt[d - e*x]*Sqrt[d + e*x])] + Sqrt[d -
 e*x]*Sqrt[d + e*x]*(3*a*(d^2 + 2*e^2*x^2) + b*n*(d^2 + 5*e^2*x^2) + 3*b*(
d^2 + 2*e^2*x^2)*Log[c*x^n]))/(d^4*x^3)
```

3.316.3 Rubi [A] (verified)

Time = 0.66 (sec) , antiderivative size = 190, normalized size of antiderivative = 0.75, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182, Rules used = {2787, 2792, 27, 358, 247, 223}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}dx$$

$$\Big\downarrow \text{ 2787}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\int \frac{a+b\log(cx^n)}{x^4\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 2792}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-bn\int -\frac{(d^2+2e^2x^2)\sqrt{1-\frac{e^2x^2}{d^2}}}{3d^2x^4}dx-\frac{2e^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3x^3}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bn\int \frac{(d^2+2e^2x^2)\sqrt{1-\frac{e^2x^2}{d^2}}}{x^4}dx}{3d^2}-\frac{2e^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3x^3}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \text{ 358}$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bn\left(2e^2\int \frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x^2}dx-\frac{d^2\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}}{3x^3}\right)}{3d^2}-\frac{2e^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3x^3}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \ 247$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(\frac{bn\left(2e^2\left(-\frac{e^2\int\frac{1}{\sqrt{1-\frac{e^2x^2}{d^2}}}dx}{d^2}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x}\right)-\frac{d^2\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}}{3x^3}\right)}{3d^2}-\frac{2e^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3x^3}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

$$\Big\downarrow \ 223$$

$$\frac{\sqrt{1-\frac{e^2x^2}{d^2}}\left(-\frac{2e^2\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3d^2x}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}(a+b\log(cx^n))}{3x^3}+\frac{bn\left(2e^2\left(-\frac{e\arcsin\left(\frac{ex}{d}\right)}{d}-\frac{\sqrt{1-\frac{e^2x^2}{d^2}}}{x}\right)-\frac{d^2\left(1-\frac{e^2x^2}{d^2}\right)^{3/2}}{3x^3}\right)}{3d^2}\right)}{\sqrt{d-ex}\sqrt{d+ex}}$$

input
```
Int[(a + b*Log[c*x^n])/(x^4*Sqrt[d - e*x]*Sqrt[d + e*x]),x]
```

output
```
(Sqrt[1 - (e^2*x^2)/d^2]*((b*n*(-1/3*(d^2*(1 - (e^2*x^2)/d^2)^(3/2))/x^3 +
 2*e^2*(-(Sqrt[1 - (e^2*x^2)/d^2]/x) - (e*ArcSin[(e*x)/d])/d)))/(3*d^2) -
(Sqrt[1 - (e^2*x^2)/d^2]*(a + b*Log[c*x^n]))/(3*x^3) - (2*e^2*Sqrt[1 - (e^
2*x^2)/d^2]*(a + b*Log[c*x^n]))/(3*d^2*x)))/(Sqrt[d - e*x]*Sqrt[d + e*x])
```

3.316.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 223
```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2], x_Symbol] :> Simp[ArcSin[Rt[-b, 2]*(x/Sqrt
[a])]/Rt[-b, 2], x] /; FreeQ[{a, b}, x] && GtQ[a, 0] && NegQ[b]
```

rule 247
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[(c*x)^
(m + 1)*((a + b*x^2)^p/(c*(m + 1))), x] - Simp[2*b*(p/(c^2*(m + 1)))   Int[
(c*x)^(m + 2)*(a + b*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && GtQ[p,
0] && LtQ[m, -1] &&  !ILtQ[(m + 2*p + 3)/2, 0] && IntBinomialQ[a, b, c, 2,
m, p, x]
```

rule 358
```
Int[((e_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2)^(p_.)*((c_) + (d_.)*(x_)^2), x_
Symbol] :> Simp[c*(e*x)^(m + 1)*((a + b*x^2)^(p + 1)/(a*e*(m + 1))), x] + S
imp[d/e^2   Int[(e*x)^(m + 2)*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e
, m, p}, x] && NeQ[b*c - a*d, 0] && EqQ[Simplify[m + 2*p + 3], 0] && NeQ[m,
 -1]
```

rule 2787
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d1_) + (e1_.)*(x_))^
(q_)*((d2_) + (e2_.)*(x_))^(q_), x_Symbol] :> Simp[(d1 + e1*x)^q*((d2 + e2*
x)^q/(1 + e1*(e2/(d1*d2))*x^2)^q)   Int[x^m*(1 + e1*(e2/(d1*d2))*x^2)^q*(a
+ b*Log[c*x^n]), x], x] /; FreeQ[{a, b, c, d1, e1, d2, e2, n}, x] && EqQ[d2
*e1 + d1*e2, 0] && IntegerQ[m] && IntegerQ[q - 1/2]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.316.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x^{4}\sqrt{-ex+d}\,\sqrt{ex+d}}dx$$

input
```
int((a+b*ln(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x)
```

3.316.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 135, normalized size of antiderivative = 0.54

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx = \frac{12\,be^3nx^3\arctan\left(\frac{\sqrt{ex+d}\sqrt{-ex+d}-d}{ex}\right)-(bd^2n+3\,ad^2+(5\,be^2n+6\,ae^2)x^2+3\,(2\,be^2x^2+bd^2)\log(c)+3\,(2}{9\,d^4x^3}$$

input
```
integrate((a+b*log(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
fricas")
```

output
```
1/9*(12*b*e^3*n*x^3*arctan((sqrt(e*x + d)*sqrt(-e*x + d) - d)/(e*x)) - (b*
d^2*n + 3*a*d^2 + (5*b*e^2*n + 6*a*e^2)*x^2 + 3*(2*b*e^2*x^2 + b*d^2)*log(
c) + 3*(2*b*e^2*n*x^2 + b*d^2*n)*log(x))*sqrt(e*x + d)*sqrt(-e*x + d))/(d^
4*x^3)
```

3.316.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**4/(-e*x+d)**(1/2)/(e*x+d)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**4*sqrt(d - e*x)*sqrt(d + e*x)), x)
```

3.316.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex+d}\sqrt{-ex+d}x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
maxima")
```

output
```
-1/3*a*(2*sqrt(-e^2*x^2 + d^2)*e^2/(d^4*x) + sqrt(-e^2*x^2 + d^2)/(d^2*x^3
)) + b*integrate((log(c) + log(x^n))/(sqrt(e*x + d)*sqrt(-e*x + d)*x^4), x
)
```

3.316.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex+d}\sqrt{-ex+d}x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^4/(-e*x+d)^(1/2)/(e*x+d)^(1/2),x, algorithm="
giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x + d)*sqrt(-e*x + d)*x^4), x)
```

3.316.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x^4\sqrt{d-ex}\sqrt{d+ex}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^4\,\sqrt{d+e\,x}\,\sqrt{d-e\,x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e*x)^(1/2)*(d - e*x)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e*x)^(1/2)*(d - e*x)^(1/2)), x)
```

3.317 $\int \frac{x \log(x)}{\sqrt{-1+x^2}} \, dx$

3.317.1 Optimal result

Integrand size = 13, antiderivative size = 34

$$\int \frac{x \log(x)}{\sqrt{-1+x^2}} \, dx = -\sqrt{-1+x^2} + \arctan\left(\sqrt{-1+x^2}\right) + \sqrt{-1+x^2}\log(x)$$

output
```
arctan((x^2-1)^(1/2))-(x^2-1)^(1/2)+ln(x)*(x^2-1)^(1/2)
```

3.317.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

$$\int \frac{x \log(x)}{\sqrt{-1+x^2}} \, dx = -\arctan\left(\frac{1}{\sqrt{-1+x^2}}\right) + \sqrt{-1+x^2}(-1+\log(x))$$

input
```
Integrate[(x*Log[x])/Sqrt[-1 + x^2],x]
```

output
```
-ArcTan[1/Sqrt[-1 + x^2]] + Sqrt[-1 + x^2]*(-1 + Log[x])
```

3.317.3 Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.21, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.385, Rules used = {2776, 243, 60, 73, 216}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x \log(x)}{\sqrt{x^2-1}}dx$$

$$\Big\downarrow \text{2776}$$

$$\sqrt{x^2-1}\log(x)-\int \frac{\sqrt{x^2-1}}{x}dx$$

$$\Big\downarrow \text{243}$$

$$\sqrt{x^2-1}\log(x)-\frac{1}{2}\int \frac{\sqrt{x^2-1}}{x^2}dx^2$$

$$\Big\downarrow \text{60}$$

$$\frac{1}{2}\left(\int \frac{1}{x^2\sqrt{x^2-1}}dx^2-2\sqrt{x^2-1}\right)+\sqrt{x^2-1}\log(x)$$

$$\Big\downarrow \text{73}$$

$$\frac{1}{2}\left(2\int \frac{1}{x^4+1}d\sqrt{x^2-1}-2\sqrt{x^2-1}\right)+\sqrt{x^2-1}\log(x)$$

$$\Big\downarrow \text{216}$$

$$\frac{1}{2}\left(2\arctan\left(\sqrt{x^2-1}\right)-2\sqrt{x^2-1}\right)+\sqrt{x^2-1}\log(x)$$

input
```
Int[(x*Log[x])/Sqrt[-1 + x^2],x]
```

output
```
(-2*Sqrt[-1 + x^2] + 2*ArcTan[Sqrt[-1 + x^2]])/2 + Sqrt[-1 + x^2]*Log[x]
```

3.317.3.1 Defintions of rubi rules used

rule 60
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
(a + b*x)^(m + 1)*((c + d*x)^n/(b*(m + n + 1))), x] + Simp[n*((b*c - a*d)/(
b*(m + n + 1)))   Int[(a + b*x)^m*(c + d*x)^(n - 1), x], x] /; FreeQ[{a, b,
 c, d}, x] && GtQ[n, 0] && NeQ[m + n + 1, 0] &&  !(IGtQ[m, 0] && ( !Integer
Q[n] || (GtQ[m, 0] && LtQ[m - n, 0]))) &&  !ILtQ[m + n + 2, 0] && IntLinear
Q[a, b, c, d, m, n, x]
```

rule 73
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Simp[p/b   Subst[Int[x^(p*(m + 1) - 1)*(c - a*(d/b) +
 d*(x^p/b))^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && Lt
Q[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Denominator[m]] && IntL
inearQ[a, b, c, d, m, n, x]
```

rule 216
```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1/(Rt[a, 2]*Rt[b, 2]))*A
rcTan[Rt[b, 2]*(x/Rt[a, 2])], x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (GtQ[a
, 0] || GtQ[b, 0])
```

rule 243
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2)^(p_), x_Symbol] :> Simp[1/2   Subst[In
t[x^((m - 1)/2)*(a + b*x)^p, x], x, x^2], x] /; FreeQ[{a, b, m, p}, x] && I
ntegerQ[(m - 1)/2]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

3.317. $\int \frac{x \log(x)}{\sqrt{-1+x^2}} \, dx$

3.317.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 3.

Time = 0.42 (sec) , antiderivative size = 119, normalized size of antiderivative = 3.50

method	result
meijerg	$-\frac{\sqrt{-\operatorname{signum}(x^2-1)}\left(2-2\sqrt{-x^2+1}\right)}{4\sqrt{\operatorname{signum}(x^2-1)}}+\frac{\sqrt{-\operatorname{signum}(x^2-1)}\ln(x)\left(2-2\sqrt{-x^2+1}\right)}{2\sqrt{\operatorname{signum}(x^2-1)}}+\frac{\sqrt{-\operatorname{signum}(x^2-1)}\left(-16+16\sqrt{-x^2+1}-32\right.}{32\sqrt{\operatorname{signum}(x^2-1)}}$

input
```
int(x*ln(x)/(x^2-1)^(1/2),x,method=_RETURNVERBOSE)
```

output
```
-1/4/signum(x^2-1)^(1/2)*(-signum(x^2-1))^(1/2)*(2-2*(-x^2+1)^(1/2))+1/2/s
ignum(x^2-1)^(1/2)*(-signum(x^2-1))^(1/2)*ln(x)*(2-2*(-x^2+1)^(1/2))+1/32/
signum(x^2-1)^(1/2)*(-signum(x^2-1))^(1/2)*(-16+16*(-x^2+1)^(1/2)-32*ln(1/
2+1/2*(-x^2+1)^(1/2)))
```

3.317.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

$$\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx = \sqrt{x^2-1}(\log(x)-1)+2\arctan\left(-x+\sqrt{x^2-1}\right)$$

input
```
integrate(x*log(x)/(x^2-1)^(1/2),x, algorithm="fricas")
```

output
```
sqrt(x^2 - 1)*(log(x) - 1) + 2*arctan(-x + sqrt(x^2 - 1))
```

3.317.6 Sympy [A] (verification not implemented)

Time = 1.21 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.85

$$\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx = \sqrt{x^2-1}\log(x)-\begin{cases}\sqrt{x^2-1}-\operatorname{acos}\left(\frac{1}{x}\right) & \text{for } x>-1\wedge x<1\end{cases}$$

input
```
integrate(x*ln(x)/(x**2-1)**(1/2),x)
```

output
```
sqrt(x**2 - 1)*log(x) - Piecewise((sqrt(x**2 - 1) - acos(1/x), (x > -1) &
(x < 1)))
```

3.317.7 Maxima [A] (verification not implemented)

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.79

$$\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx = \sqrt{x^2-1}\log(x) - \sqrt{x^2-1} - \arcsin\left(\frac{1}{|x|}\right)$$

input
```
integrate(x*log(x)/(x^2-1)^(1/2),x, algorithm="maxima")
```

output
```
sqrt(x^2 - 1)*log(x) - sqrt(x^2 - 1) - arcsin(1/abs(x))
```

3.317.8 Giac [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.82

$$\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx = \sqrt{x^2-1}\log(x) - \sqrt{x^2-1} + \arctan\left(\sqrt{x^2-1}\right)$$

input
```
integrate(x*log(x)/(x^2-1)^(1/2),x, algorithm="giac")
```

output
```
sqrt(x^2 - 1)*log(x) - sqrt(x^2 - 1) + arctan(sqrt(x^2 - 1))
```

3.317.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x\log(x)}{\sqrt{-1+x^2}}\,dx = \int \frac{x\ln(x)}{\sqrt{x^2-1}}\,dx$$

input
```
int((x*log(x))/(x^2 - 1)^(1/2),x)
```

output
```
int((x*log(x))/(x^2 - 1)^(1/2), x)
```

3.318 $\int (fx)^m (d+ex^2)^3 (a+b\log(cx^n))\,dx$

3.318.1 Optimal result

Integrand size = 25, antiderivative size = 211

$$\int (fx)^m (d+ex^2)^3 (a+b\log(cx^n))\,dx = -\frac{bd^3n(fx)^{1+m}}{f(1+m)^2}-\frac{3bd^2en(fx)^{3+m}}{f^3(3+m)^2}-\frac{3bde^2n(fx)^{5+m}}{f^5(5+m)^2}-\frac{be^3n(fx)^{7+m}}{f^7(7+m)^2}+\frac{d^3(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}+\frac{3d^2e(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)}+\frac{3de^2(fx)^{5+m}(a+b\log(cx^n))}{f^5(5+m)}+\frac{e^3(fx)^{7+m}(a+b\log(cx^n))}{f^7(7+m)}$$

output
```
-b*d^3*n*(f*x)^(1+m)/f/(1+m)^2-3*b*d^2*e*n*(f*x)^(3+m)/f^3/(3+m)^2-3*b*d*e
^2*n*(f*x)^(5+m)/f^5/(5+m)^2-b*e^3*n*(f*x)^(7+m)/f^7/(7+m)^2+d^3*(f*x)^(1+
m)*(a+b*ln(c*x^n))/f/(1+m)+3*d^2*e*(f*x)^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)+3
*d*e^2*(f*x)^(5+m)*(a+b*ln(c*x^n))/f^5/(5+m)+e^3*(f*x)^(7+m)*(a+b*ln(c*x^n
))/f^7/(7+m)
```

3.318.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 156, normalized size of antiderivative = 0.74

$$\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx = x(fx)^m\left(-\frac{bd^3n}{(1+m)^2}-\frac{3bd^2enx^2}{(3+m)^2}-\frac{3bde^2nx^4}{(5+m)^2}-\frac{be^3nx^6}{(7+m)^2}+\frac{d^3(a+b\log(cx^n))}{1+m}+\frac{3d^2ex^2(a+b\log(cx^n))}{3+m}+\frac{3de^2x^4(a+b\log(cx^n))}{5+m}+\frac{e^3x^6(a+b\log(cx^n))}{7+m}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d^3*n)/(1 + m)^2) - (3*b*d^2*e*n*x^2)/(3 + m)^2 - (3*b*d*e
^2*n*x^4)/(5 + m)^2 - (b*e^3*n*x^6)/(7 + m)^2 + (d^3*(a + b*Log[c*x^n]))/(
1 + m) + (3*d^2*e*x^2*(a + b*Log[c*x^n]))/(3 + m) + (3*d*e^2*x^4*(a + b*Lo
g[c*x^n]))/(5 + m) + (e^3*x^6*(a + b*Log[c*x^n]))/(7 + m))
```

3.318.3 Rubi [A] (verified)

Time = 1.44 (sec) , antiderivative size = 206, normalized size of antiderivative = 0.98, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.120$, Rules used = {2792, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^2\right)^3 (fx)^m (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int (fx)^m\left(\frac{e^3x^6}{m+7}+\frac{3de^2x^4}{m+5}+\frac{3d^2ex^2}{m+3}+\frac{d^3}{m+1}\right)dx+\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2e(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{3de^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}+\frac{e^3(fx)^{m+7}(a+b\log(cx^n))}{f^7(m+7)}$$

$$\Big\downarrow \text{2010}$$

$$-bn\int \left(\frac{d^3(fx)^m}{m+1}+\frac{3d^2e(fx)^{m+2}}{f^2(m+3)}+\frac{3de^2(fx)^{m+4}}{f^4(m+5)}+\frac{e^3(fx)^{m+6}}{f^6(m+7)}\right)dx+\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2e(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{3de^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}+\frac{e^3(fx)^{m+7}(a+b\log(cx^n))}{f^7(m+7)}$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2e(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{3de^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}+\frac{e^3(fx)^{m+7}(a+b\log(cx^n))}{f^7(m+7)}-bn\left(\frac{d^3(fx)^{m+1}}{f(m+1)^2}+\frac{3d^2e(fx)^{m+3}}{f^3(m+3)^2}+\frac{3de^2(fx)^{m+5}}{f^5(m+5)^2}+\frac{e^3(fx)^{m+7}}{f^7(m+7)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x^2)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d^3*(f*x)^(1 + m))/(f*(1 + m)^2) + (3*d^2*e*(f*x)^(3 + m))/(f^3*(3
 + m)^2) + (3*d*e^2*(f*x)^(5 + m))/(f^5*(5 + m)^2) + (e^3*(f*x)^(7 + m))/(
f^7*(7 + m)^2))) + (d^3*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m)) + (3
*d^2*e*(f*x)^(3 + m)*(a + b*Log[c*x^n]))/(f^3*(3 + m)) + (3*d*e^2*(f*x)^(5
 + m)*(a + b*Log[c*x^n]))/(f^5*(5 + m)) + (e^3*(f*x)^(7 + m)*(a + b*Log[c*
x^n]))/(f^7*(7 + m))
```

3.318.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.318. $\int (fx)^m (d+ex^2)^3 (a+b\log(cx^n))\,dx$

3.318.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1760 vs. 2(211) = 422.

Time = 27.45 (sec) , antiderivative size = 1761, normalized size of antiderivative = 8.35

method	result	size
parallelrisch	Expression too large to display	1761
risch	Expression too large to display	5073

input
```
int((f*x)^m*(e*x^2+d)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-1575*e^3*b*ln(c*x^n)*(f*x)^m*x^7-x^7*(f*x)^m*a*e^3*m^7-25*x^7*(f*x)^m*a
*e^3*m^6-253*x^7*(f*x)^m*a*e^3*m^5-1333*x^7*(f*x)^m*a*e^3*m^4-3907*x^7*(f*
x)^m*a*e^3*m^3-6283*x^7*(f*x)^m*a*e^3*m^2-5055*x^7*(f*x)^m*a*e^3*m+225*x^7
*(f*x)^m*b*e^3*n-6615*x^5*(f*x)^m*a*d*e^2-11025*x^3*(f*x)^m*a*d^2*e-11025*
x*(f*x)^m*a*d^3-1575*x^7*(f*x)^m*a*e^3-3*x^5*(f*x)^m*ln(c*x^n)*b*d*e^2*m^7
-81*x^5*(f*x)^m*ln(c*x^n)*b*d*e^2*m^6+3*x^5*(f*x)^m*b*d*e^2*m^6*n-879*x^5*
(f*x)^m*ln(c*x^n)*b*d*e^2*m^5+66*x^5*(f*x)^m*b*d*e^2*m^5*n-3*x^3*(f*x)^m*l
n(c*x^n)*b*d^2*e*m^7-4917*x^5*(f*x)^m*ln(c*x^n)*b*d*e^2*m^4+549*x^5*(f*x)^
m*b*d*e^2*m^4*n-87*x^3*(f*x)^m*ln(c*x^n)*b*d^2*e*m^6+3*x^3*(f*x)^m*b*d^2*e
*m^6*n-15129*x^5*(f*x)^m*ln(c*x^n)*b*d*e^2*m^3+2172*x^5*(f*x)^m*b*d*e^2*m^
3*n-1023*x^3*(f*x)^m*ln(c*x^n)*b*d^2*e*m^5+78*x^3*(f*x)^m*b*d^2*e*m^5*n-25
251*x^5*(f*x)^m*ln(c*x^n)*b*d*e^2*m^2+4269*x^5*(f*x)^m*b*d*e^2*m^2*n-6243*
x^3*(f*x)^m*ln(c*x^n)*b*d^2*e*m^4+789*x^3*(f*x)^m*b*d^2*e*m^4*n-20853*x^5*
(f*x)^m*ln(c*x^n)*b*d*e^2*m+3906*x^5*(f*x)^m*b*d*e^2*m*n-20985*x^3*(f*x)^m
*ln(c*x^n)*b*d^2*e*m^3+3876*x^3*(f*x)^m*b*d^2*e*m^3*n-37941*x^3*(f*x)^m*ln
(c*x^n)*b*d^2*e*m^2+9357*x^3*(f*x)^m*b*d^2*e*m^2*n-33285*x^3*(f*x)^m*ln(c*
x^n)*b*d^2*e*m+9870*x^3*(f*x)^m*b*d^2*e*m*n+11025*x*(f*x)^m*b*d^3*n-11025*
b*d^3*ln(c*x^n)*(f*x)^m*x-10531*x*(f*x)^m*ln(c*x^n)*b*d^3*m^3+2340*x*(f*x)
^m*b*d^3*m^3*n-23101*x*(f*x)^m*ln(c*x^n)*b*d^3*m^2+8191*x*(f*x)^m*b*d^3*m^
2*n-x*(f*x)^m*a*d^3*m^7-31*x*(f*x)^m*a*d^3*m^6-397*x*(f*x)^m*a*d^3*m^5-...
```

3.318.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1222 vs. $2(211) = 422$.

Time = 0.30 (sec) , antiderivative size = 1222, normalized size of antiderivative = 5.79

$$\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n)) \, dx = \text{Too large to display}$$

input
```
integrate((f*x)^m*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((a*e^3*m^7 + 25*a*e^3*m^6 + 253*a*e^3*m^5 + 1333*a*e^3*m^4 + 3907*a*e^3*m
^3 + 6283*a*e^3*m^2 + 5055*a*e^3*m + 1575*a*e^3 - (b*e^3*m^6 + 18*b*e^3*m^
5 + 127*b*e^3*m^4 + 444*b*e^3*m^3 + 799*b*e^3*m^2 + 690*b*e^3*m + 225*b*e^
3)*n)*x^7 + 3*(a*d*e^2*m^7 + 27*a*d*e^2*m^6 + 293*a*d*e^2*m^5 + 1639*a*d*e
^2*m^4 + 5043*a*d*e^2*m^3 + 8417*a*d*e^2*m^2 + 6951*a*d*e^2*m + 2205*a*d*e
^2 - (b*d*e^2*m^6 + 22*b*d*e^2*m^5 + 183*b*d*e^2*m^4 + 724*b*d*e^2*m^3 + 1
423*b*d*e^2*m^2 + 1302*b*d*e^2*m + 441*b*d*e^2)*n)*x^5 + 3*(a*d^2*e*m^7 +
29*a*d^2*e*m^6 + 341*a*d^2*e*m^5 + 2081*a*d^2*e*m^4 + 6995*a*d^2*e*m^3 + 1
2647*a*d^2*e*m^2 + 11095*a*d^2*e*m + 3675*a*d^2*e - (b*d^2*e*m^6 + 26*b*d^
2*e*m^5 + 263*b*d^2*e*m^4 + 1292*b*d^2*e*m^3 + 3119*b*d^2*e*m^2 + 3290*b*d
^2*e*m + 1225*b*d^2*e)*n)*x^3 + (a*d^3*m^7 + 31*a*d^3*m^6 + 397*a*d^3*m^5
+ 2707*a*d^3*m^4 + 10531*a*d^3*m^3 + 23101*a*d^3*m^2 + 25935*a*d^3*m + 110
25*a*d^3 - (b*d^3*m^6 + 30*b*d^3*m^5 + 367*b*d^3*m^4 + 2340*b*d^3*m^3 + 81
91*b*d^3*m^2 + 14910*b*d^3*m + 11025*b*d^3)*n)*x + ((b*e^3*m^7 + 25*b*e^3*
m^6 + 253*b*e^3*m^5 + 1333*b*e^3*m^4 + 3907*b*e^3*m^3 + 6283*b*e^3*m^2 + 5
055*b*e^3*m + 1575*b*e^3)*x^7 + 3*(b*d*e^2*m^7 + 27*b*d*e^2*m^6 + 293*b*d*
e^2*m^5 + 1639*b*d*e^2*m^4 + 5043*b*d*e^2*m^3 + 8417*b*d*e^2*m^2 + 6951*b*
d*e^2*m + 2205*b*d*e^2)*x^5 + 3*(b*d^2*e*m^7 + 29*b*d^2*e*m^6 + 341*b*d^2*
e*m^5 + 2081*b*d^2*e*m^4 + 6995*b*d^2*e*m^3 + 12647*b*d^2*e*m^2 + 11095*b*
d^2*e*m + 3675*b*d^2*e)*x^3 + (b*d^3*m^7 + 31*b*d^3*m^6 + 397*b*d^3*m^5...
```

3.318.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 6217 vs. $2(206) = 412$.

Time = 13.51 (sec) , antiderivative size = 6217, normalized size of antiderivative = 29.46

$$\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n)) \, dx = \text{Too large to display}$$

input
```
integrate((f*x)**m*(e*x**2+d)**3*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise(((-a*d**3/(6*x**6) - 3*a*d**2*e/(4*x**4) - 3*a*d*e**2/(2*x**2) +
 a*e**3*log(x) + b*d**3*(-n/(36*x**6) - log(c*x**n)/(6*x**6)) + 3*b*d**2*e
*(-n/(16*x**4) - log(c*x**n)/(4*x**4)) + 3*b*d*e**2*(-n/(4*x**2) - log(c*x
**n)/(2*x**2)) - b*e**3*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n
)**2/(2*n), True)))/f**7, Eq(m, -7)), ((-a*d**3/(4*x**4) - 3*a*d**2*e/(2*x
**2) + 3*a*d*e**2*log(c*x**n)/n + a*e**3*x**2/2 - b*d**3*n/(16*x**4) - b*d
**3*log(c*x**n)/(4*x**4) - 3*b*d**2*e*n/(4*x**2) - 3*b*d**2*e*log(c*x**n)/
(2*x**2) + 3*b*d*e**2*log(c*x**n)**2/(2*n) - b*e**3*n*x**2/4 + b*e**3*x**2
*log(c*x**n)/2)/f**5, Eq(m, -5)), ((-a*d**3/(2*x**2) + 3*a*d**2*e*log(c*x*
*n)/n + 3*a*d*e**2*x**2/2 + a*e**3*x**4/4 - b*d**3*n/(4*x**2) - b*d**3*log
(c*x**n)/(2*x**2) + 3*b*d**2*e*log(c*x**n)**2/(2*n) - 3*b*d*e**2*n*x**2/4
+ 3*b*d*e**2*x**2*log(c*x**n)/2 - b*e**3*n*x**4/16 + b*e**3*x**4*log(c*x**
n)/4)/f**3, Eq(m, -3)), ((a*d**3*log(c*x**n)/n + 3*a*d**2*e*x**2/2 + 3*a*d
*e**2*x**4/4 + a*e**3*x**6/6 + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*e*n*
x**2/4 + 3*b*d**2*e*x**2*log(c*x**n)/2 - 3*b*d*e**2*n*x**4/16 + 3*b*d*e**2
*x**4*log(c*x**n)/4 - b*e**3*n*x**6/36 + b*e**3*x**6*log(c*x**n)/6)/f, Eq(
m, -1)), (a*d**3*m**7*x*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 +
13238*m**4 + 33632*m**3 + 49036*m**2 + 36960*m + 11025) + 31*a*d**3*m**6*x
*(f*x)**m/(m**8 + 32*m**7 + 428*m**6 + 3104*m**5 + 13238*m**4 + 33632*m**3
 + 49036*m**2 + 36960*m + 11025) + 397*a*d**3*m**5*x*(f*x)**m/(m**8 + 3...
```

3.318.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 271, normalized size of antiderivative = 1.28

$$\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx = \frac{be^3f^mx^7x^m\log(cx^n)}{m+7} + \frac{ae^3f^mx^7x^m}{m+7} - \frac{be^3f^mnx^7x^m}{(m+7)^2} + \frac{3\,bde^2f^mx^5x^m\log(cx^n)}{m+5} + \frac{3\,ade^2f^mx^5x^m}{m+5} - \frac{3\,bde^2f^mnx^5x^m}{(m+5)^2} + \frac{3\,bd^2ef^mx^3x^m\log(cx^n)}{m+3} + \frac{3\,ad^2ef^mx^3x^m}{m+3} - \frac{3\,bd^2ef^mnx^3x^m}{(m+3)^2} - \frac{bd^3f^mnxx^m}{(m+1)^2} + \frac{(fx)^{m+1}\,bd^3\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}\,ad^3}{f(m+1)}$$

input
```
integrate((f*x)^m*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e^3*f^m*x^7*x^m*log(c*x^n)/(m + 7) + a*e^3*f^m*x^7*x^m/(m + 7) - b*e^3*f
^m*n*x^7*x^m/(m + 7)^2 + 3*b*d*e^2*f^m*x^5*x^m*log(c*x^n)/(m + 5) + 3*a*d*
e^2*f^m*x^5*x^m/(m + 5) - 3*b*d*e^2*f^m*n*x^5*x^m/(m + 5)^2 + 3*b*d^2*e*f^
m*x^3*x^m*log(c*x^n)/(m + 3) + 3*a*d^2*e*f^m*x^3*x^m/(m + 3) - 3*b*d^2*e*f
^m*n*x^3*x^m/(m + 3)^2 - b*d^3*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*d^3
*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d^3/(f*(m + 1))
```

3.318.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 558 vs. $2(211) = 422$.

Time = 0.38 (sec) , antiderivative size = 558, normalized size of antiderivative = 2.64

$$\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n))\,dx = \frac{be^3f^6f^mx^7x^m\log(c)}{f^6m+7f^6} + \frac{ae^3f^6f^mx^7x^m}{f^6m+7f^6} + \frac{3\,bde^2f^4f^mx^5x^m\log(c)}{f^4m+5f^4} + \frac{be^3f^mmnx^7x^m\log(x)}{m^2+14m+49} + \frac{3\,ade^2f^4f^mx^5x^m}{f^4m+5f^4} + \frac{7\,be^3f^mnx^7x^m\log(x)}{m^2+14m+49} - \frac{be^3f^mnx^7x^m}{m^2+14m+49} + \frac{3\,bde^2f^mmnx^5x^m\log(x)}{m^2+10m+25} + \frac{15\,bde^2f^mnx^5x^m\log(x)}{m^2+10m+25} - \frac{3\,bde^2f^mnx^5x^m}{m^2+10m+25} + \frac{3\,bd^2ef^2f^mx^3x^m\log(c)}{f^2m+3f^2} + \frac{3\,bd^2ef^mmnx^3x^m\log(x)}{m^2+6m+9} + \frac{3\,ad^2ef^2f^mx^3x^m}{f^2m+3f^2} + \frac{9\,bd^2ef^mnx^3x^m\log(x)}{m^2+6m+9} - \frac{3\,bd^2ef^mnx^3x^m}{m^2+6m+9} + \frac{bd^3f^mmnxx^m\log(x)}{m^2+2m+1} + \frac{bd^3f^mnxx^m\log(x)}{m^2+2m+1} - \frac{bd^3f^mnxx^m}{m^2+2m+1} + \frac{(fx)^m\,bd^3x\log(c)}{m+1} + \frac{(fx)^m\,ad^3x}{m+1}$$

input
```
integrate((f*x)^m*(e*x^2+d)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e^3*f^6*f^m*x^7*x^m*log(c)/(f^6*m + 7*f^6) + a*e^3*f^6*f^m*x^7*x^m/(f^6*
m + 7*f^6) + 3*b*d*e^2*f^4*f^m*x^5*x^m*log(c)/(f^4*m + 5*f^4) + b*e^3*f^m*
m*n*x^7*x^m*log(x)/(m^2 + 14*m + 49) + 3*a*d*e^2*f^4*f^m*x^5*x^m/(f^4*m +
5*f^4) + 7*b*e^3*f^m*n*x^7*x^m*log(x)/(m^2 + 14*m + 49) - b*e^3*f^m*n*x^7*
x^m/(m^2 + 14*m + 49) + 3*b*d*e^2*f^m*m*n*x^5*x^m*log(x)/(m^2 + 10*m + 25)
 + 15*b*d*e^2*f^m*n*x^5*x^m*log(x)/(m^2 + 10*m + 25) - 3*b*d*e^2*f^m*n*x^5
*x^m/(m^2 + 10*m + 25) + 3*b*d^2*e*f^2*f^m*x^3*x^m*log(c)/(f^2*m + 3*f^2)
+ 3*b*d^2*e*f^m*m*n*x^3*x^m*log(x)/(m^2 + 6*m + 9) + 3*a*d^2*e*f^2*f^m*x^3
*x^m/(f^2*m + 3*f^2) + 9*b*d^2*e*f^m*n*x^3*x^m*log(x)/(m^2 + 6*m + 9) - 3*
b*d^2*e*f^m*n*x^3*x^m/(m^2 + 6*m + 9) + b*d^3*f^m*m*n*x*x^m*log(x)/(m^2 +
2*m + 1) + b*d^3*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - b*d^3*f^m*n*x*x^m/(m
^2 + 2*m + 1) + (f*x)^m*b*d^3*x*log(c)/(m + 1) + (f*x)^m*a*d^3*x/(m + 1)
```

3.318.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m \left(d+ex^2\right)^3 (a+b\log(cx^n))\, dx = \int (f\,x)^m \left(e\,x^2+d\right)^3 (a+b\,\ln(c\,x^n))\, dx$$

input
```
int((f*x)^m*(d + e*x^2)^3*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(d + e*x^2)^3*(a + b*log(c*x^n)), x)
```

3.319 $\int (fx)^m (d+ex^2)^2 (a+b\log(cx^n))\,dx$

3.319.1 Optimal result

Integrand size = 25, antiderivative size = 153

$$\int (fx)^m (d+ex^2)^2 (a+b\log(cx^n))\,dx = -\frac{bd^2n(fx)^{1+m}}{f(1+m)^2} - \frac{2bden(fx)^{3+m}}{f^3(3+m)^2} - \frac{be^2n(fx)^{5+m}}{f^5(5+m)^2} + \frac{d^2(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)} + \frac{2de(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)} + \frac{e^2(fx)^{5+m}(a+b\log(cx^n))}{f^5(5+m)}$$

output
```
-b*d^2*n*(f*x)^(1+m)/f/(1+m)^2-2*b*d*e*n*(f*x)^(3+m)/f^3/(3+m)^2-b*e^2*n*(
f*x)^(5+m)/f^5/(5+m)^2+d^2*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)+2*d*e*(f*x)
^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)+e^2*(f*x)^(5+m)*(a+b*ln(c*x^n))/f^5/(5+m)
```

3.319.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 112, normalized size of antiderivative = 0.73

$$\int (fx)^m (d+ex^2)^2 (a+b\log(cx^n))\,dx = x(fx)^m \left(-\frac{bd^2n}{(1+m)^2} - \frac{2bdenx^2}{(3+m)^2} - \frac{be^2nx^4}{(5+m)^2} + \frac{d^2(a+b\log(cx^n))}{1+m} + \frac{2dex^2(a+b\log(cx^n))}{3+m} + \frac{e^2x^4(a+b\log(cx^n))}{5+m}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d^2*n)/(1 + m)^2) - (2*b*d*e*n*x^2)/(3 + m)^2 - (b*e^2*n*x
^4)/(5 + m)^2 + (d^2*(a + b*Log[c*x^n]))/(1 + m) + (2*d*e*x^2*(a + b*Log[c
*x^n]))/(3 + m) + (e^2*x^4*(a + b*Log[c*x^n]))/(5 + m))
```

3.319.3 Rubi [A] (verified)

Time = 0.45 (sec) , antiderivative size = 183, normalized size of antiderivative = 1.20, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.160$, Rules used = {2792, 27, 1433, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^2)^2 (fx)^m (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int \frac{(fx)^m\left(e^2(m+1)(m+3)x^4+2de(m+1)(m+5)x^2+d^2(m+3)(m+5)\right)}{m^3+9m^2+23m+15}dx+\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2de(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int (fx)^m\left(e^2(m+1)(m+3)x^4+2de(m+1)(m+5)x^2+d^2(m+3)(m+5)\right)dx}{m^3+9m^2+23m+15}+\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2de(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}$$

$$\Big\downarrow \text{1433}$$

$$-\frac{bn\int \left(d^2(m+3)(m+5)(fx)^m+\frac{2de(m+1)(m+5)(fx)^{m+2}}{f^2}+\frac{e^2(m+1)(m+3)(fx)^{m+4}}{f^4}\right)dx}{m^3+9m^2+23m+15}+\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2de(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2de(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}+\frac{e^2(fx)^{m+5}(a+b\log(cx^n))}{f^5(m+5)}-\frac{bn\left(\frac{d^2(m+3)(m+5)(fx)^{m+1}}{f(m+1)}+\frac{2de(m+1)(m+5)(fx)^{m+3}}{f^3(m+3)}+\frac{e^2(m+1)(m+3)(fx)^{m+5}}{f^5(m+5)}\right)}{m^3+9m^2+23m+15}$$

input
```
Int[(f*x)^m*(d + e*x^2)^2*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*((d^2*(3 + m)*(5 + m)*(f*x)^(1 + m))/(f*(1 + m)) + (2*d*e*(1 + m)*(
5 + m)*(f*x)^(3 + m))/(f^3*(3 + m)) + (e^2*(1 + m)*(3 + m)*(f*x)^(5 + m))/
(f^5*(5 + m))))/(15 + 23*m + 9*m^2 + m^3)) + (d^2*(f*x)^(1 + m)*(a + b*Log
[c*x^n]))/(f*(1 + m)) + (2*d*e*(f*x)^(3 + m)*(a + b*Log[c*x^n]))/(f^3*(3 +
 m)) + (e^2*(f*x)^(5 + m)*(a + b*Log[c*x^n]))/(f^5*(5 + m))
```

3.319.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1433
```
Int[((d_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol]
 :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a,
b, c, d, m}, x] && IGtQ[p, 0] && (EqQ[p, 1] ||  !IntegerQ[(m + 1)/2])
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.319.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 915 vs. $2(153) = 306$.

Time = 5.72 (sec) , antiderivative size = 916, normalized size of antiderivative = 5.99

method	result
parallelrisch	$-\frac{-225x(fx)^{m} a\,d^{2}-150x^{3}(fx)^{m} ade-x^{5}(fx)^{m} a\,e^{2}m^{5}-13x^{5}(fx)^{m} a\,e^{2}m^{4}-62x^{5}(fx)^{m} a\,e^{2}m^{3}-134x^{5}(fx)^{m} a\,e^{2}m^{2}-129x^{5}}{}$
risch	Expression too large to display

input
```
int((f*x)^m*(e*x^2+d)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-225*x*(f*x)^m*a*d^2-150*x^3*(f*x)^m*a*d*e-x^5*(f*x)^m*a*e^2*m^5-13*x^5*
(f*x)^m*a*e^2*m^4-62*x^5*(f*x)^m*a*e^2*m^3-134*x^5*(f*x)^m*a*e^2*m^2-129*x
^5*(f*x)^m*a*e^2*m+9*x^5*(f*x)^m*b*e^2*n-45*e^2*b*ln(c*x^n)*(f*x)^m*x^5-22
5*x*(f*x)^m*ln(c*x^n)*b*d^2-x*(f*x)^m*a*d^2*m^5-17*x*(f*x)^m*a*d^2*m^4-110
*x*(f*x)^m*a*d^2*m^3-334*x*(f*x)^m*a*d^2*m^2-465*x*(f*x)^m*a*d^2*m+225*x*(
f*x)^m*b*d^2*n-2*x^3*(f*x)^m*ln(c*x^n)*b*d*e*m^5-30*x^3*(f*x)^m*ln(c*x^n)*
b*d*e*m^4+2*x^3*(f*x)^m*b*d*e*m^4*n-164*x^3*(f*x)^m*ln(c*x^n)*b*d*e*m^3+24
*x^3*(f*x)^m*b*d*e*m^3*n-396*x^3*(f*x)^m*ln(c*x^n)*b*d*e*m^2+92*x^3*(f*x)^
m*b*d*e*m^2*n-410*x^3*(f*x)^m*ln(c*x^n)*b*d*e*m+120*x^3*(f*x)^m*b*d*e*m*n-
x*(f*x)^m*ln(c*x^n)*b*d^2*m^5-17*x*(f*x)^m*ln(c*x^n)*b*d^2*m^4+x*(f*x)^m*b
*d^2*m^4*n-110*x*(f*x)^m*ln(c*x^n)*b*d^2*m^3+16*x*(f*x)^m*b*d^2*m^3*n-334*
x*(f*x)^m*ln(c*x^n)*b*d^2*m^2+94*x*(f*x)^m*b*d^2*m^2*n-465*x*(f*x)^m*ln(c*
x^n)*b*d^2*m+240*x*(f*x)^m*b*d^2*m*n-45*x^5*(f*x)^m*a*e^2-13*x^5*(f*x)^m*l
n(c*x^n)*b*e^2*m^4+x^5*(f*x)^m*b*e^2*m^4*n-62*x^5*(f*x)^m*ln(c*x^n)*b*e^2*
m^3+8*x^5*(f*x)^m*b*e^2*m^3*n-134*x^5*(f*x)^m*ln(c*x^n)*b*e^2*m^2+22*x^5*(
f*x)^m*b*e^2*m^2*n-150*b*d*e*ln(c*x^n)*(f*x)^m*x^3-2*x^3*(f*x)^m*a*d*e*m^5
-129*x^5*(f*x)^m*ln(c*x^n)*b*e^2*m+24*x^5*(f*x)^m*b*e^2*m*n-30*x^3*(f*x)^m
*a*d*e*m^4-164*x^3*(f*x)^m*a*d*e*m^3-396*x^3*(f*x)^m*a*d*e*m^2-410*x^3*(f*
x)^m*a*d*e*m+50*x^3*(f*x)^m*b*d*e*n-x^5*(f*x)^m*ln(c*x^n)*b*e^2*m^5)/(m^2+
10*m+25)/(3+m)^2/(1+m)^2
```

3.319.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 633 vs. $2(153) = 306$.

Time = 0.30 (sec) , antiderivative size = 633, normalized size of antiderivative = 4.14

$$\int (fx)^m (d + ex^2)^2 (a + b\log(cx^n))\, dx$$
$$= \frac{((ae^2m^5 + 13\,ae^2m^4 + 62\,ae^2m^3 + 134\,ae^2m^2 + 129\,ae^2m + 45\,ae^2 - (be^2m^4 + 8\,be^2m^3 + 22\,be^2m^2 + 24\,b}{}$$

input
```
integrate((f*x)^m*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((a*e^2*m^5 + 13*a*e^2*m^4 + 62*a*e^2*m^3 + 134*a*e^2*m^2 + 129*a*e^2*m +
45*a*e^2 - (b*e^2*m^4 + 8*b*e^2*m^3 + 22*b*e^2*m^2 + 24*b*e^2*m + 9*b*e^2)
*n)*x^5 + 2*(a*d*e*m^5 + 15*a*d*e*m^4 + 82*a*d*e*m^3 + 198*a*d*e*m^2 + 205
*a*d*e*m + 75*a*d*e - (b*d*e*m^4 + 12*b*d*e*m^3 + 46*b*d*e*m^2 + 60*b*d*e*
m + 25*b*d*e)*n)*x^3 + (a*d^2*m^5 + 17*a*d^2*m^4 + 110*a*d^2*m^3 + 334*a*d
^2*m^2 + 465*a*d^2*m + 225*a*d^2 - (b*d^2*m^4 + 16*b*d^2*m^3 + 94*b*d^2*m^
2 + 240*b*d^2*m + 225*b*d^2)*n)*x + ((b*e^2*m^5 + 13*b*e^2*m^4 + 62*b*e^2*
m^3 + 134*b*e^2*m^2 + 129*b*e^2*m + 45*b*e^2)*x^5 + 2*(b*d*e*m^5 + 15*b*d*
e*m^4 + 82*b*d*e*m^3 + 198*b*d*e*m^2 + 205*b*d*e*m + 75*b*d*e)*x^3 + (b*d^
2*m^5 + 17*b*d^2*m^4 + 110*b*d^2*m^3 + 334*b*d^2*m^2 + 465*b*d^2*m + 225*b
*d^2)*x)*log(c) + ((b*e^2*m^5 + 13*b*e^2*m^4 + 62*b*e^2*m^3 + 134*b*e^2*m^
2 + 129*b*e^2*m + 45*b*e^2)*n*x^5 + 2*(b*d*e*m^5 + 15*b*d*e*m^4 + 82*b*d*e
*m^3 + 198*b*d*e*m^2 + 205*b*d*e*m + 75*b*d*e)*n*x^3 + (b*d^2*m^5 + 17*b*d
^2*m^4 + 110*b*d^2*m^3 + 334*b*d^2*m^2 + 465*b*d^2*m + 225*b*d^2)*n*x)*log
(x))*e^(m*log(f) + m*log(x))/(m^6 + 18*m^5 + 127*m^4 + 444*m^3 + 799*m^2 +
 690*m + 225)
```

3.319.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 2820 vs. 2(146) = 292.

Time = 5.45 (sec) , antiderivative size = 2820, normalized size of antiderivative = 18.43

$$\int (fx)^m \left(d+ex^2\right)^2 (a+b\log(cx^n))\, dx = \text{Too large to display}$$

input
```
integrate((f*x)**m*(e*x**2+d)**2*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise(((-a*d**2/(4*x**4) - a*d*e/x**2 + a*e**2*log(x) + b*d**2*(-n/(16
*x**4) - log(c*x**n)/(4*x**4)) + 2*b*d*e*(-n/(4*x**2) - log(c*x**n)/(2*x**
2)) - b*e**2*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n),
 True)))/f**5, Eq(m, -5)), ((-a*d**2/(2*x**2) + 2*a*d*e*log(c*x**n)/n + a*
e**2*x**2/2 - b*d**2*n/(4*x**2) - b*d**2*log(c*x**n)/(2*x**2) + b*d*e*log(
c*x**n)**2/n - b*e**2*n*x**2/4 + b*e**2*x**2*log(c*x**n)/2)/f**3, Eq(m, -3
)), ((a*d**2*log(c*x**n)/n + a*d*e*x**2 + a*e**2*x**4/4 + b*d**2*log(c*x**
n)**2/(2*n) - b*d*e*n*x**2/2 + b*d*e*x**2*log(c*x**n) - b*e**2*n*x**4/16 +
 b*e**2*x**4*log(c*x**n)/4)/f, Eq(m, -1)), (a*d**2*m**5*x*(f*x)**m/(m**6 +
 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 17*a*d**2*m**4*
x*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225)
 + 110*a*d**2*m**3*x*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*
m**2 + 690*m + 225) + 334*a*d**2*m**2*x*(f*x)**m/(m**6 + 18*m**5 + 127*m**
4 + 444*m**3 + 799*m**2 + 690*m + 225) + 465*a*d**2*m*x*(f*x)**m/(m**6 + 1
8*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 225*a*d**2*x*(f*x
)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 2*a
*d*e*m**5*x**3*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 444*m**3 + 799*m**2 +
 690*m + 225) + 30*a*d*e*m**4*x**3*(f*x)**m/(m**6 + 18*m**5 + 127*m**4 + 4
44*m**3 + 799*m**2 + 690*m + 225) + 164*a*d*e*m**3*x**3*(f*x)**m/(m**6 + 1
8*m**5 + 127*m**4 + 444*m**3 + 799*m**2 + 690*m + 225) + 396*a*d*e*m**2...
```

3.319.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 195, normalized size of antiderivative = 1.27

$$\int (fx)^m (d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{be^2f^mx^5x^m\log(cx^n)}{m+5} + \frac{ae^2f^mx^5x^m}{m+5} - \frac{be^2f^mnx^5x^m}{(m+5)^2} + \frac{2\,bdef^mx^3x^m\log(cx^n)}{m+3} + \frac{2\,adef^mx^3x^m}{m+3} - \frac{2\,bdef^mnx^3x^m}{(m+3)^2} - \frac{bd^2f^mnxx^m}{(m+1)^2} + \frac{(fx)^{m+1}bd^2\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}ad^2}{f(m+1)}$$

input
```
integrate((f*x)^m*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e^2*f^m*x^5*x^m*log(c*x^n)/(m + 5) + a*e^2*f^m*x^5*x^m/(m + 5) - b*e^2*f
^m*n*x^5*x^m/(m + 5)^2 + 2*b*d*e*f^m*x^3*x^m*log(c*x^n)/(m + 3) + 2*a*d*e*
f^m*x^3*x^m/(m + 3) - 2*b*d*e*f^m*n*x^3*x^m/(m + 3)^2 - b*d^2*f^m*n*x*x^m/
(m + 1)^2 + (f*x)^(m + 1)*b*d^2*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d
^2/(f*(m + 1))
```

3.319.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 396 vs. $2(153) = 306$.

Time = 0.37 (sec) , antiderivative size = 396, normalized size of antiderivative = 2.59

$$\int (fx)^m (d+ex^2)^2 (a+b\log(cx^n))\,dx = \frac{be^2f^4f^mx^5x^m\log(c)}{f^4m+5f^4} + \frac{ae^2f^4f^mx^5x^m}{f^4m+5f^4} + \frac{be^2f^mmnx^5x^m\log(x)}{m^2+10m+25} + \frac{5be^2f^mnx^5x^m\log(x)}{m^2+10m+25} - \frac{be^2f^mnx^5x^m}{m^2+10m+25} + \frac{2bdef^2f^mx^3x^m\log(c)}{f^2m+3f^2} + \frac{2bdef^mmnx^3x^m\log(x)}{m^2+6m+9} + \frac{2adef^2f^mx^3x^m}{f^2m+3f^2} + \frac{6bdef^mnx^3x^m\log(x)}{m^2+6m+9} - \frac{2bdef^mnx^3x^m}{m^2+6m+9} + \frac{bd^2f^mmnxx^m\log(x)}{m^2+2m+1} + \frac{bd^2f^mnxx^m\log(x)}{m^2+2m+1} - \frac{bd^2f^mnxx^m}{m^2+2m+1} + \frac{(fx)^m bd^2x\log(c)}{m+1} + \frac{(fx)^m ad^2x}{m+1}$$

input
```
integrate((f*x)^m*(e*x^2+d)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e^2*f^4*f^m*x^5*x^m*log(c)/(f^4*m + 5*f^4) + a*e^2*f^4*f^m*x^5*x^m/(f^4*
m + 5*f^4) + b*e^2*f^m*m*n*x^5*x^m*log(x)/(m^2 + 10*m + 25) + 5*b*e^2*f^m*
n*x^5*x^m*log(x)/(m^2 + 10*m + 25) - b*e^2*f^m*n*x^5*x^m/(m^2 + 10*m + 25)
 + 2*b*d*e*f^2*f^m*x^3*x^m*log(c)/(f^2*m + 3*f^2) + 2*b*d*e*f^m*m*n*x^3*x^
m*log(x)/(m^2 + 6*m + 9) + 2*a*d*e*f^2*f^m*x^3*x^m/(f^2*m + 3*f^2) + 6*b*d
*e*f^m*n*x^3*x^m*log(x)/(m^2 + 6*m + 9) - 2*b*d*e*f^m*n*x^3*x^m/(m^2 + 6*m
 + 9) + b*d^2*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*d^2*f^m*n*x*x^m*log
(x)/(m^2 + 2*m + 1) - b*d^2*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*d^2*x*
log(c)/(m + 1) + (f*x)^m*a*d^2*x/(m + 1)
```

3.319.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m \left(d+ex^2\right)^2 (a+b\log (cx^n))\, dx = \int (f\,x)^m\,\left(e\,x^2+d\right)^2\,\left(a+b\,\ln \left(c\,x^n\right)\right) \,d x$$

input
```
int((f*x)^m*(d + e*x^2)^2*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(d + e*x^2)^2*(a + b*log(c*x^n)), x)
```

3.320 $\int (fx)^m (d+ex^2)(a+b\log(cx^n))\,dx$

3.320.1 Optimal result

Integrand size = 23, antiderivative size = 95

$$\int (fx)^m (d+ex^2)(a+b\log(cx^n))\,dx = -\frac{bdn(fx)^{1+m}}{f(1+m)^2}-\frac{ben(fx)^{3+m}}{f^3(3+m)^2}+\frac{d(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}+\frac{e(fx)^{3+m}(a+b\log(cx^n))}{f^3(3+m)}$$

output
```
-b*d*n*(f*x)^(1+m)/f/(1+m)^2-b*e*n*(f*x)^(3+m)/f^3/(3+m)^2+d*(f*x)^(1+m)*(
a+b*ln(c*x^n))/f/(1+m)+e*(f*x)^(3+m)*(a+b*ln(c*x^n))/f^3/(3+m)
```

3.320.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 68, normalized size of antiderivative = 0.72

$$\int (fx)^m (d+ex^2)(a+b\log(cx^n))\,dx = x(fx)^m\left(-\frac{bdn}{(1+m)^2}-\frac{benx^2}{(3+m)^2}+\frac{d(a+b\log(cx^n))}{1+m}+\frac{ex^2(a+b\log(cx^n))}{3+m}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d*n)/(1 + m)^2) - (b*e*n*x^2)/(3 + m)^2 + (d*(a + b*Log[c*
x^n]))/(1 + m) + (e*x^2*(a + b*Log[c*x^n]))/(3 + m))
```

3.320.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 94, normalized size of antiderivative = 0.99, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2792, 244, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^2)(fx)^m (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int (fx)^m\left(\frac{ex^2}{m+3}+\frac{d}{m+1}\right)dx+\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{e(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}$$

$$\Big\downarrow \text{244}$$

$$-bn\int \left(\frac{d(fx)^m}{m+1}+\frac{e(fx)^{m+2}}{f^2(m+3)}\right)dx+\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{e(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{e(fx)^{m+3}(a+b\log(cx^n))}{f^3(m+3)}-bn\left(\frac{d(fx)^{m+1}}{f(m+1)^2}+\frac{e(fx)^{m+3}}{f^3(m+3)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x^2)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((d*(f*x)^(1 + m))/(f*(1 + m)^2) + (e*(f*x)^(3 + m))/(f^3*(3 + m)^2)
)) + (d*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m)) + (e*(f*x)^(3 + m)*(
a + b*Log[c*x^n]))/(f^3*(3 + m))
```

3.320.3.1 Defintions of rubi rules used

rule 244
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[(c*x)^m*(a + b*x^2)^p, x], x] /; FreeQ[{a, b, c, m}, x] && IGtQ[p
, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.320.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 342 vs. $2(95) = 190$.

Time = 0.90 (sec) , antiderivative size = 343, normalized size of antiderivative = 3.61

method	result
parallelrisch	$-\frac{-3x^3(fx)^m ae-9x(fx)^m ad-x(fx)^m ad\,m^3-7x(fx)^m ad\,m^2-15x(fx)^m adm+9x(fx)^m bdn-9x(fx)^m \ln(c\,x^n)bd-x^3(fx)^m}{}$
risch	Expression too large to display

input
```
int((f*x)^m*(e*x^2+d)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-3*x^3*(f*x)^m*a*e-9*x*(f*x)^m*a*d-x*(f*x)^m*a*d*m^3-7*x*(f*x)^m*a*d*m^2
-15*x*(f*x)^m*a*d*m+9*x*(f*x)^m*b*d*n-9*x*(f*x)^m*ln(c*x^n)*b*d-x^3*(f*x)^
m*a*e*m^3-5*x^3*(f*x)^m*a*e*m^2-7*x^3*(f*x)^m*a*e*m+x^3*(f*x)^m*b*e*n-3*x^
3*(f*x)^m*ln(c*x^n)*b*e-x*(f*x)^m*ln(c*x^n)*b*d*m^3-7*x*(f*x)^m*ln(c*x^n)*
b*d*m^2+x*(f*x)^m*b*d*m^2*n-15*x*(f*x)^m*ln(c*x^n)*b*d*m+6*x*(f*x)^m*b*d*m
*n-x^3*(f*x)^m*ln(c*x^n)*b*e*m^3-5*x^3*(f*x)^m*ln(c*x^n)*b*e*m^2+x^3*(f*x)
^m*b*e*m^2*n-7*x^3*(f*x)^m*ln(c*x^n)*b*e*m+2*x^3*(f*x)^m*b*e*m*n)/(3+m)^2/
(1+m)^2
```

3.320.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 235 vs. $2(95) = 190$.

Time = 0.29 (sec) , antiderivative size = 235, normalized size of antiderivative = 2.47

$$\int (fx)^m \left(d+ex^2\right) (a+b\log(cx^n))\, dx$$
$$= \frac{((aem^3+5\,aem^2+7\,aem+3\,ae-(bem^2+2\,bem+be)n)x^3+(adm^3+7\,adm^2+15\,adm+9\,ad-(bdm}{}$$

input
```
integrate((f*x)^m*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((a*e*m^3 + 5*a*e*m^2 + 7*a*e*m + 3*a*e - (b*e*m^2 + 2*b*e*m + b*e)*n)*x^3
 + (a*d*m^3 + 7*a*d*m^2 + 15*a*d*m + 9*a*d - (b*d*m^2 + 6*b*d*m + 9*b*d)*n
)*x + ((b*e*m^3 + 5*b*e*m^2 + 7*b*e*m + 3*b*e)*x^3 + (b*d*m^3 + 7*b*d*m^2
+ 15*b*d*m + 9*b*d)*x)*log(c) + ((b*e*m^3 + 5*b*e*m^2 + 7*b*e*m + 3*b*e)*n
*x^3 + (b*d*m^3 + 7*b*d*m^2 + 15*b*d*m + 9*b*d)*n*x)*log(x))*e^(m*log(f) +
 m*log(x))/(m^4 + 8*m^3 + 22*m^2 + 24*m + 9)
```

3.320.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 920 vs. $2(87) = 174$.

Time = 2.71 (sec) , antiderivative size = 920, normalized size of antiderivative = 9.68

$$\int (fx)^m \left(d+ex^2\right) (a+b\log(cx^n))\, dx = \begin{cases} \frac{-\frac{ad}{2x^2}+ae\log(x)+bd\left(-\frac{n}{4x^2}-\frac{\log(cx^n)}{2x^2}\right)-be\left(\begin{cases} -\log(c)\log(x) & \text{for}\ n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right)}{f^3} \\ \frac{\frac{ad\log(cx^n)}{n}+\frac{aex^2}{2}+\frac{bd\log(cx^n)^2}{2n}-\frac{benx^2}{4}+\frac{bex^2\log(cx^n)}{2}}{f} \\ \frac{adm^3x(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{7adm^2x(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{15admx(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{9adx(fx)^m}{m^4+8m^3+22m^2+24m+9}+\frac{aem^3x^3(fx)}{m^4+8m^3+22m^2+} \end{cases}$$

input
```
integrate((f*x)**m*(e*x**2+d)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise(((-a*d/(2*x**2) + a*e*log(x) + b*d*(-n/(4*x**2) - log(c*x**n)/(2
*x**2)) - b*e*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n)
, True)))/f**3, Eq(m, -3)), ((a*d*log(c*x**n)/n + a*e*x**2/2 + b*d*log(c*x
**n)**2/(2*n) - b*e*n*x**2/4 + b*e*x**2*log(c*x**n)/2)/f, Eq(m, -1)), (a*d
*m**3*x*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 7*a*d*m**2*x*(f*x)
**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 15*a*d*m*x*(f*x)**m/(m**4 + 8*m
**3 + 22*m**2 + 24*m + 9) + 9*a*d*x*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24
*m + 9) + a*e*m**3*x**3*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 5*
a*e*m**2*x**3*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 7*a*e*m*x**3
*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 3*a*e*x**3*(f*x)**m/(m**4
 + 8*m**3 + 22*m**2 + 24*m + 9) + b*d*m**3*x*(f*x)**m*log(c*x**n)/(m**4 +
8*m**3 + 22*m**2 + 24*m + 9) - b*d*m**2*n*x*(f*x)**m/(m**4 + 8*m**3 + 22*m
**2 + 24*m + 9) + 7*b*d*m**2*x*(f*x)**m*log(c*x**n)/(m**4 + 8*m**3 + 22*m*
*2 + 24*m + 9) - 6*b*d*m*n*x*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9)
 + 15*b*d*m*x*(f*x)**m*log(c*x**n)/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) -
9*b*d*n*x*(f*x)**m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 9*b*d*x*(f*x)**m
*log(c*x**n)/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + b*e*m**3*x**3*(f*x)**m
*log(c*x**n)/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) - b*e*m**2*n*x**3*(f*x)*
*m/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) + 5*b*e*m**2*x**3*(f*x)**m*log(c*x
**n)/(m**4 + 8*m**3 + 22*m**2 + 24*m + 9) - 2*b*e*m*n*x**3*(f*x)**m/(m*...
```

3.320.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 119, normalized size of antiderivative = 1.25

$$\int (fx)^m (d+ex^2) (a+b\log(cx^n)) \, dx = \frac{bef^m x^3 x^m \log(cx^n)}{m+3} + \frac{aef^m x^3 x^m}{m+3} - \frac{bef^m n x^3 x^m}{(m+3)^2} - \frac{bdf^m n x x^m}{(m+1)^2} + \frac{(fx)^{m+1} bd\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1} ad}{f(m+1)}$$

input
```
integrate((f*x)^m*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e*f^m*x^3*x^m*log(c*x^n)/(m + 3) + a*e*f^m*x^3*x^m/(m + 3) - b*e*f^m*n*x
^3*x^m/(m + 3)^2 - b*d*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*d*log(c*x^n
)/(f*(m + 1)) + (f*x)^(m + 1)*a*d/(f*(m + 1))
```

3.320.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 234 vs. $2(95) = 190$.

Time = 0.34 (sec) , antiderivative size = 234, normalized size of antiderivative = 2.46

$$\int (fx)^m (d+ex^2)(a+b\log(cx^n))\,dx = \frac{bef^2f^mx^3x^m\log(c)}{f^2m+3f^2} + \frac{bef^mmnx^3x^m\log(x)}{m^2+6m+9} + \frac{aef^2f^mx^3x^m}{f^2m+3f^2} + \frac{3bef^mnx^3x^m\log(x)}{m^2+6m+9} - \frac{bef^mnx^3x^m}{m^2+6m+9} + \frac{bdf^mmnxx^m\log(x)}{m^2+2m+1} + \frac{bdf^mnxx^m\log(x)}{m^2+2m+1} - \frac{bdf^mnxx^m}{m^2+2m+1} + \frac{(fx)^m bdx\log(c)}{m+1} + \frac{(fx)^m adx}{m+1}$$

input
```
integrate((f*x)^m*(e*x^2+d)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*f^2*f^m*x^3*x^m*log(c)/(f^2*m + 3*f^2) + b*e*f^m*m*n*x^3*x^m*log(x)/(m
^2 + 6*m + 9) + a*e*f^2*f^m*x^3*x^m/(f^2*m + 3*f^2) + 3*b*e*f^m*n*x^3*x^m*
log(x)/(m^2 + 6*m + 9) - b*e*f^m*n*x^3*x^m/(m^2 + 6*m + 9) + b*d*f^m*m*n*x
*x^m*log(x)/(m^2 + 2*m + 1) + b*d*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - b*d
*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*d*x*log(c)/(m + 1) + (f*x)^m*a*d*
x/(m + 1)
```

3.320.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^2)(a+b\log(cx^n))\,dx = \int (f\,x)^m\,\left(e\,x^2+d\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int((f*x)^m*(d + e*x^2)*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(d + e*x^2)*(a + b*log(c*x^n)), x)
```

3.321 $\int (fx)^m (a+b\log(cx^n))\,dx$

3.321.1 Optimal result

Integrand size = 16, antiderivative size = 46

$$\int (fx)^m (a+b\log(cx^n))\,dx = -\frac{bn(fx)^{1+m}}{f(1+m)^2}+\frac{(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}$$

output
```
-b*n*(f*x)^(1+m)/f/(1+m)^2+(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)
```

3.321.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.70

$$\int (fx)^m (a+b\log(cx^n))\,dx = \frac{x(fx)^m(a+am-bn+b(1+m)\log(cx^n))}{(1+m)^2}$$

input
```
Integrate[(f*x)^m*(a + b*Log[c*x^n]),x]
```

output
```
(x*(f*x)^m*(a + a*m - b*n + b*(1 + m)*Log[c*x^n]))/(1 + m)^2
```

3.321.3 Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {2741}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (a + b\log(cx^n))\, dx$$

$$\Big\downarrow \ 2741$$

$$\frac{(fx)^{m+1}(a + b\log(cx^n))}{f(m+1)} - \frac{bn(fx)^{m+1}}{f(m+1)^2}$$

input
```
Int[(f*x)^m*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*(f*x)^(1 + m))/(f*(1 + m)^2)) + ((f*x)^(1 + m)*(a + b*Log[c*x^n]))/
(f*(1 + m))
```

3.321.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

3.321.4 Maple [A] (verified)

Time = 0.00 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.48

method	result
parallelrisch	$-\frac{-x(fx)^m \ln(c\,x^n)bm - x(fx)^m \ln(c\,x^n)b - x(fx)^m am + x(fx)^m bn - x(fx)^m a}{(1+m)^2}$
risch	$\frac{bx\,x^m f^m \mathrm{e}^{\frac{i\,\mathrm{csgn}(ifx)\pi m(\mathrm{csgn}(ifx)-\mathrm{csgn}(ix))(-\mathrm{csgn}(ifx)+\mathrm{csgn}(if))}{2}} \ln(x^n)}{1+m} - \frac{\Big(i\pi b\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)m - i\pi b\ \mathrm{csgn}(i}{}$

input
```
int((f*x)^m*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-x*(f*x)^m*ln(c*x^n)*b*m-x*(f*x)^m*ln(c*x^n)*b-x*(f*x)^m*a*m+x*(f*x)^m*b
*n-x*(f*x)^m*a)/(1+m)^2
```

3.321.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.13

$$\int (fx)^m (a + b\log(cx^n))\,dx = \frac{((bm+b)nx\log(x) + (bm+b)x\log(c) + (am-bn+a)x)e^{(m\log(f)+m\log(x))}}{m^2+2\,m+1}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((b*m + b)*n*x*log(x) + (b*m + b)*x*log(c) + (a*m - b*n + a)*x)*e^(m*log(f
) + m*log(x))/(m^2 + 2*m + 1)
```

3.321.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 141 vs. 2(37) = 74.

Time = 2.18 (sec) , antiderivative size = 141, normalized size of antiderivative = 3.07

$$\int (fx)^m (a + b\log(cx^n))\,dx = \begin{cases} \frac{amx(fx)^m}{m^2+2m+1} + \frac{ax(fx)^m}{m^2+2m+1} + \frac{bmx(fx)^m\log(cx^n)}{m^2+2m+1} - \frac{bnx(fx)^m}{m^2+2m+1} + \frac{bx(fx)^m\log(cx^n)}{m^2+2m+1} & \text{for } m \neq -1 \\ \frac{\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a-b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}}{f} & \text{otherwise} \end{cases}$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*m*x*(f*x)**m/(m**2 + 2*m + 1) + a*x*(f*x)**m/(m**2 + 2*m + 1)
 + b*m*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1) - b*n*x*(f*x)**m/(m**2 + 2*
m + 1) + b*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1), Ne(m, -1)), (Piecewise
((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c
*x**n))**2/(2*b*n), True))/f, True))
```

3.321.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.24

$$\int (fx)^m (a + b\log(cx^n)) \, dx = -\frac{bf^m n x x^m}{(m+1)^2} + \frac{(fx)^{m+1} b\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1} a}{f(m+1)}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*log(c*x^n)/(f*(m + 1)) + (f*x)^
(m + 1)*a/(f*(m + 1))
```

3.321.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. 2(46) = 92.

Time = 0.33 (sec) , antiderivative size = 95, normalized size of antiderivative = 2.07

$$\int (fx)^m (a + b\log(cx^n)) \, dx = \frac{bf^m mnxx^m \log(x)}{m^2 + 2m + 1} + \frac{bf^m nxx^m \log(x)}{m^2 + 2m + 1} - \frac{bf^m nxx^m}{m^2 + 2m + 1} + \frac{(fx)^m bx\log(c)}{m+1} + \frac{(fx)^m ax}{m+1}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*f^m*n*x*x^m*log(x)/(m^2 + 2*m +
 1) - b*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*x*log(c)/(m + 1) + (f*x)^m
*a*x/(m + 1)
```

3.321.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m (a + b\log(cx^n)) \, dx = \int (f\,x)^m \,(a + b\,\ln(c\,x^n)) \, dx$$

input
```
int((f*x)^m*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n)), x)
```

3.322 $\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex^2}\,dx$

3.322.1 Optimal result

Integrand size = 25, antiderivative size = 25

$$\int \frac{(fx)^m\,(a+b\log(cx^n))}{d+ex^2}\,dx = \text{Int}\left(\frac{(fx)^m\,(a+b\log(cx^n))}{d+ex^2},x\right)$$

output
```
Unintegrable((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d),x)
```

3.322.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 108 vs. 2(28) = 56.

Time = 0.70 (sec) , antiderivative size = 108, normalized size of antiderivative = 4.32

$$\int \frac{(fx)^m\,(a+b\log(cx^n))}{d+ex^2}\,dx = \frac{x(fx)^m\left(-bn\,{}_3F_2\left(1,\frac{1}{2}+\frac{m}{2},\frac{1}{2}+\frac{m}{2};\frac{3}{2}+\frac{m}{2},\frac{3}{2}+\frac{m}{2};-\frac{ex^2}{d}\right)+(1+m)\,\text{Hypergeometric2F1}\left(1,\frac{1+m}{2},\frac{3+m}{2},-\right.\right.}{d(1+m)^2}$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
(x*(f*x)^m*(-(b*n*HypergeometricPFQ[{1, 1/2 + m/2, 1/2 + m/2}, {3/2 + m/2,
 3/2 + m/2}, -((e*x^2)/d)]) + (1 + m)*Hypergeometric2F1[1, (1 + m)/2, (3 +
 m)/2, -((e*x^2)/d)]*(a + b*Log[c*x^n])))/(d*(1 + m)^2)
```

3.322.3 Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a+b\log(cx^n))}{d+ex^2} dx$$

$$\Big\downarrow \text{2796}$$

$$\int \frac{(fx)^m (a+b\log(cx^n))}{d+ex^2} dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2),x]
```

output
```
$Aborted
```

3.322.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.322.4 Maple [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a+b\ln(c\,x^n))}{e\,x^2+d} dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d),x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d),x)
```

3.322.5 Fricas [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^2} \, dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{ex^2 + d} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="fricas")
```

output
```
integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(e*x^2 + d), x)
```

3.322.6 Sympy [N/A]

Not integrable

Time = 7.11 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^2} \, dx = \int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^2} \, dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))/(e*x**2+d),x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x**2), x)
```

3.322.7 Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^2} \, dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{ex^2 + d} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^2 + d), x)
```

3.322.8 Giac [N/A]

Not integrable

Time = 0.38 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(b\log(cx^n)+a)(fx)^m}{ex^2+d}\,dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^2 + d), x)
```

3.322.9 Mupad [N/A]

Not integrable

Time = 0.41 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a+b\log(cx^n))}{d+ex^2}\,dx = \int \frac{(f\,x)^m\,(a+b\,\ln(c\,x^n))}{e\,x^2+d}\,dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^2),x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^2), x)
```

3.323 $\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$

3.323.1 Optimal result

Integrand size = 25, antiderivative size = 25

$$\int \frac{(fx)^m\,(a+b\log(cx^n))}{(d+ex^2)^2}\,dx=\text{Int}\left(\frac{(fx)^m\,(a+b\log(cx^n))}{(d+ex^2)^2},x\right)$$

output
```
Unintegrable((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d)^2,x)
```

3.323.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 108 vs. 2(28) = 56.

Time = 0.14 (sec) , antiderivative size = 108, normalized size of antiderivative = 4.32

$$\int \frac{(fx)^m\,(a+b\log(cx^n))}{(d+ex^2)^2}\,dx$$
$$=\frac{x(fx)^m\left(-bn\,{}_3F_2\left(2,\frac{1}{2}+\frac{m}{2},\frac{1}{2}+\frac{m}{2};\frac{3}{2}+\frac{m}{2},\frac{3}{2}+\frac{m}{2};-\frac{ex^2}{d}\right)+(1+m)\,\text{Hypergeometric2F1}\left(2,\frac{1+m}{2},\frac{3+m}{2},-\right.\right.}{d^2(1+m)^2}$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
(x*(f*x)^m*(-(b*n*HypergeometricPFQ[{2, 1/2 + m/2, 1/2 + m/2}, {3/2 + m/2,
 3/2 + m/2}, -((e*x^2)/d)]) + (1 + m)*Hypergeometric2F1[2, (1 + m)/2, (3 +
 m)/2, -((e*x^2)/d)]*(a + b*Log[c*x^n])))/(d^2*(1 + m)^2)
```

3.323.3 Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d+ex^2)^2} \, dx$$
$$\Big\downarrow \; 2796$$
$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d+ex^2)^2} dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^2)^2,x]
```

output
```
$Aborted
```

3.323.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.323.4 Maple [N/A]

Not integrable

Time = 0.04 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a + b\ln(c\,x^n))}{(e\,x^2 + d)^2} dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d)^2,x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))/(e*x^2+d)^2,x)
```

3.323.5 Fricas [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.76

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^2)^2} dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex^2 + d)^2} dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="fricas")
```

output
```
integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(e^2*x^4 + 2*d*e*x^2 + d^2), x
)
```

3.323.6 Sympy [N/A]

Not integrable

Time = 162.22 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^2)^2} dx = \int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^2)^2} dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))/(e*x**2+d)**2,x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x**2)**2, x)
```

3.323.7 Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^2)^2} dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex^2 + d)^2} dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^2 + d)^2, x)
```

3.323.8 Giac [N/A]

Not integrable

Time = 0.42 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(b\log(cx^n)+a)(fx)^m}{(ex^2+d)^2}\,dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(e*x^2+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^2 + d)^2, x)
```

3.323.9 Mupad [N/A]

Not integrable

Time = 0.45 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^2)^2}\,dx = \int \frac{(f\,x)^m\,(a+b\,\ln(c\,x^n))}{(e\,x^2+d)^2}\,dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^2)^2,x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^2)^2, x)
```

3.324 $\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx$

3.324.1 Optimal result

Integrand size = 22, antiderivative size = 1198

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx = \text{Too large to display}$$

output
```
1/9*x*(a+b*ln(c*x^n))^3/d^(5/3)/(d^(1/3)+e^(1/3)*x)-(-1)^(1/3)*x*(a+b*ln(c
*x^n))^3/(1+(-1)^(1/3))^4/d^(5/3)/((-1)^(2/3)*d^(1/3)+e^(1/3)*x)+1/9*x*(a+
b*ln(c*x^n))^3/d^(5/3)/(d^(1/3)+(-1)^(2/3)*e^(1/3)*x)-1/3*b*n*(a+b*ln(c*x^
n))^2*ln(1+e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2/9*(a+b*ln(c*x^n))^3*ln(1+e
^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+3*(-1)^(1/3)*b*n*(a+b*ln(c*x^n))^2*ln(1-
(-1)^(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)+1/3*(-1)^(1
/3)*b*n*(a+b*ln(c*x^n))^2*ln(1+(-1)^(2/3)*e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/
3)-2/3*b^2*n^2*(a+b*ln(c*x^n))*polylog(2,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/
3)+2/3*b*n*(a+b*ln(c*x^n))^2*polylog(2,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)
+6*(-1)^(1/3)*b^2*n^2*(a+b*ln(c*x^n))*polylog(2,(-1)^(1/3)*e^(1/3)*x/d^(1/
3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)+2/3*(-1)^(1/3)*b^2*n^2*(a+b*ln(c*x^n)
)*polylog(2,-(-1)^(2/3)*e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2/3*b^3*n^3*pol
ylog(3,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-4/3*b^2*n^2*(a+b*ln(c*x^n))*pol
ylog(3,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-6*(-1)^(1/3)*b^3*n^3*polylog(3,
(-1)^(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)-2/3*(-1)^(1
/3)*b^3*n^3*polylog(3,-(-1)^(2/3)*e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+4/3*b
^3*n^3*polylog(4,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-4/9*(a+b*ln(c*x^n))^3
*ln(1-1/2*e^(1/3)*x*(1-I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1-I*3^(1/2))-4
/3*b*n*(a+b*ln(c*x^n))^2*polylog(2,1/2*e^(1/3)*x*(1-I*3^(1/2))/d^(1/3))/d^
(5/3)/e^(1/3)/(1-I*3^(1/2))+8/3*b^2*n^2*(a+b*ln(c*x^n))*polylog(3,1/2*e...
```

3.324.2 Mathematica [A] (verified)

Time = 7.31 (sec) , antiderivative size = 2215, normalized size of antiderivative = 1.85

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx = \text{Result too large to show}$$

input
```
Integrate[(a + b*Log[c*x^n])^3/(d + e*x^3)^2,x]
```

output
```
(x*(a + b*(-(n*Log[x]) + Log[c*x^n]))^3)/(3*d*(d + e*x^3)) + (2*ArcTan[(-d
^(1/3) + 2*e^(1/3)*x)/(Sqrt[3]*d^(1/3))]*(a + b*(-(n*Log[x]) + Log[c*x^n])
)^3)/(3*Sqrt[3]*d^(5/3)*e^(1/3)) + (2*(a + b*(-(n*Log[x]) + Log[c*x^n]))^3
*Log[d^(1/3) + e^(1/3)*x])/(9*d^(5/3)*e^(1/3)) - ((a + b*(-(n*Log[x]) + Lo
g[c*x^n]))^3*Log[d^(2/3) - d^(1/3)*e^(1/3)*x + e^(2/3)*x^2])/(9*d^(5/3)*e^
(1/3)) + 3*b*n*(a + b*(-(n*Log[x]) + Log[c*x^n]))^2*(-1/3*((-1 + (-1)^(1/3
))*((-((-1)^(1/3)/d^(1/3)) - ((-1)^(2/3)*d^(1/3) + e^(1/3)*x)^(-1))*Log[x]
 + ((-1)^(1/3)*Log[-((-1)^(2/3)*d^(1/3)) - e^(1/3)*x])/d^(1/3)))/((1 + (-1
)^(1/3))^2*d^(4/3)*e^(1/3)) + ((-1)^(1/3)*((d^(-1/3) - (d^(1/3) + e^(1/3)*
x)^(-1))*Log[x] - Log[d^(1/3) + e^(1/3)*x]/d^(1/3)))/(3*(1 + (-1)^(1/3))^2
*d^(4/3)*e^(1/3)) - (Log[x]/(e^(1/3)*((-1)^(1/3)*d^(1/3) - e^(1/3)*x)) - (
-(((-1)^(2/3)*Log[x])/d^(1/3)) + ((-1)^(2/3)*Log[d^(1/3) + (-1)^(2/3)*e^(1
/3)*x])/d^(1/3))/e^(1/3))/(3*(1 + (-1)^(1/3))^2*d^(4/3)) + (2*(-1)^(1/3)*(
Log[x]*Log[1 + (e^(1/3)*x)/d^(1/3)] + PolyLog[2, -((e^(1/3)*x)/d^(1/3))]))
/(3*(1 + (-1)^(1/3))^2*d^(5/3)*e^(1/3)) - (2*(Log[x]*Log[1 - ((-1)^(1/3)*e
^(1/3)*x)/d^(1/3)] + PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)]))/(3*(1 +
(-1)^(1/3))^2*d^(5/3)*e^(1/3)) - (2*(-1 + (-1)^(1/3))*(Log[x]*Log[1 + ((-1
)^(2/3)*e^(1/3)*x)/d^(1/3)] + PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))
]))/(3*(1 + (-1)^(1/3))^2*d^(5/3)*e^(1/3))) + 3*b^2*n^2*(a + b*(-(n*Log[x]
) + Log[c*x^n]))*(((-1)^(1/3)*(Log[x]*((e^(1/3)*x*Log[x])/(d^(1/3) + e^...
```

3.324.3 Rubi [A] (verified)

Time = 1.79 (sec) , antiderivative size = 1198, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.091$, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx$$

$$\Big\downarrow \text{ 2767}$$

$$\int \left(\frac{2(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}-\frac{2(-1)^{5/6}\sqrt{3}(a+b\log(cx^n))^3}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\left(\sqrt[3]{-1}\sqrt[3]{e}x-\sqrt[3]{d}\right)}+\frac{2(-1)^{2/3}(a+b\log(cx^n))^3}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)}+\frac{(a-}{9d^{4/3}}\right.$$

$$\Big\downarrow \text{ 2009}$$

3.324. $\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx$

$$\frac{2b^3\operatorname{PolyLog}\left(3,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^3}{3d^{5/3}\sqrt[3]{e}}-\frac{6\sqrt[3]{-1}b^3\operatorname{PolyLog}\left(3,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^3}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}-$$

$$\frac{2\sqrt[3]{-1}b^3\operatorname{PolyLog}\left(3,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^3}{3d^{5/3}\sqrt[3]{e}}+\frac{4b^3\operatorname{PolyLog}\left(4,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^3}{3d^{5/3}\sqrt[3]{e}}-$$

$$\frac{12i\sqrt{3}b^3\operatorname{PolyLog}\left(4,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^3}{\left(1+\sqrt[3]{-1}\right)^5d^{5/3}\sqrt[3]{e}}+\frac{12b^3\operatorname{PolyLog}\left(4,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^3}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}-$$

$$\frac{2b^2(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{3d^{5/3}\sqrt[3]{e}}+$$

$$\frac{6\sqrt[3]{-1}b^2(a+b\log(cx^n))\operatorname{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}+$$

$$\frac{2\sqrt[3]{-1}b^2(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{3d^{5/3}\sqrt[3]{e}}-$$

$$\frac{4b^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{3d^{5/3}\sqrt[3]{e}}+$$

$$\frac{12i\sqrt{3}b^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{\left(1+\sqrt[3]{-1}\right)^5d^{5/3}\sqrt[3]{e}}-$$

$$\frac{12b^2(a+b\log(cx^n))\operatorname{PolyLog}\left(3,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}-\frac{b(a+b\log(cx^n))^2\log\left(\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)n}{3d^{5/3}\sqrt[3]{e}}+$$

$$\frac{3\sqrt[3]{-1}b(a+b\log(cx^n))^2\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}+$$

$$\frac{\sqrt[3]{-1}b(a+b\log(cx^n))^2\log\left(\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)n}{3d^{5/3}\sqrt[3]{e}}+\frac{2b(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{3d^{5/3}\sqrt[3]{e}}-$$

$$\frac{6i\sqrt{3}b(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{\left(1+\sqrt[3]{-1}\right)^5d^{5/3}\sqrt[3]{e}}+$$

$$\frac{6b(a+b\log(cx^n))^2\operatorname{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}+\frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left(\sqrt[3]{e}x+\sqrt[3]{d}\right)}-$$

$$\frac{\sqrt[3]{-1}x(a+b\log(cx^n))^3}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\left(\sqrt[3]{e}x+(-1)^{2/3}\sqrt[3]{d}\right)}+\frac{x(a+b\log(cx^n))^3}{9d^{5/3}\left((-1)^{2/3}\sqrt[3]{e}x+\sqrt[3]{d}\right)}+$$

$$\frac{2(a+b\log(cx^n))^3\log\left(\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)}{9d^{5/3}\sqrt[3]{e}}-\frac{2i\sqrt{3}(a+b\log(cx^n))^3\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^5d^{5/3}\sqrt[3]{e}}+$$

3.324. $\int\frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx$

$$\frac{2(a+b\log(cx^n))^3\log\left(\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)}{\left(1+\sqrt[3]{-1}\right)^4d^{5/3}\sqrt[3]{e}}$$

input
```
Int[(a + b*Log[c*x^n])^3/(d + e*x^3)^2,x]
```

output
```
(x*(a + b*Log[c*x^n])^3)/(9*d^(5/3)*(d^(1/3) + e^(1/3)*x)) - ((-1)^(1/3)*x
*(a + b*Log[c*x^n])^3)/((1 + (-1)^(1/3))^4*d^(5/3)*((-1)^(2/3)*d^(1/3) + e
^(1/3)*x)) + (x*(a + b*Log[c*x^n])^3)/(9*d^(5/3)*(d^(1/3) + (-1)^(2/3)*e^(
1/3)*x)) - (b*n*(a + b*Log[c*x^n])^2*Log[1 + (e^(1/3)*x)/d^(1/3)])/(3*d^(5
/3)*e^(1/3)) + (2*(a + b*Log[c*x^n])^3*Log[1 + (e^(1/3)*x)/d^(1/3)])/(9*d^
(5/3)*e^(1/3)) + (3*(-1)^(1/3)*b*n*(a + b*Log[c*x^n])^2*Log[1 - ((-1)^(1/3
)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) - ((2*I)*Sqrt[
3]*(a + b*Log[c*x^n])^3*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1
)^(1/3))^5*d^(5/3)*e^(1/3)) + ((-1)^(1/3)*b*n*(a + b*Log[c*x^n])^2*Log[1 +
 ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)])/(3*d^(5/3)*e^(1/3)) + (2*(a + b*Log[c*x^
n])^3*Log[1 + ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)
*e^(1/3)) - (2*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[2, -((e^(1/3)*x)/d^(1/3)
)])/(3*d^(5/3)*e^(1/3)) + (2*b*n*(a + b*Log[c*x^n])^2*PolyLog[2, -((e^(1/3
)*x)/d^(1/3))])/(3*d^(5/3)*e^(1/3)) + (6*(-1)^(1/3)*b^2*n^2*(a + b*Log[c*x
^n])*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/
3)*e^(1/3)) - ((6*I)*Sqrt[3]*b*n*(a + b*Log[c*x^n])^2*PolyLog[2, ((-1)^(1/
3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^5*d^(5/3)*e^(1/3)) + (2*(-1)^(1/
3)*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))
])/(3*d^(5/3)*e^(1/3)) + (6*b*n*(a + b*Log[c*x^n])^2*PolyLog[2, -(((-1)^(2
/3)*e^(1/3)*x)/d^(1/3))])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) + (2*b^3...
```

3.324.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

3.324.4 Maple [F]

$$\int \frac{(a+b\ln (c\,x^{n}))^{3}}{(e\,x^{3}+d)^{2}}dx$$

input
```
int((a+b*ln(c*x^n))^3/(e*x^3+d)^2,x)
```

output
```
int((a+b*ln(c*x^n))^3/(e*x^3+d)^2,x)
```

3.324.5 Fricas [F]

$$\int \frac{(a+b\log (cx^{n}))^{3}}{(d+ex^{3})^{2}}\,dx = \int \frac{(b\log (cx^{n})+a)^{3}}{(ex^{3}+d)^{2}}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/(e*x^3+d)^2,x, algorithm="fricas")
```

output
```
integral((b^3*log(c*x^n)^3 + 3*a*b^2*log(c*x^n)^2 + 3*a^2*b*log(c*x^n) + a
^3)/(e^2*x^6 + 2*d*e*x^3 + d^2), x)
```

3.324.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(a+b\log (cx^{n}))^{3}}{(d+ex^{3})^{2}}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))**3/(e*x**3+d)**2,x)
```

output
```
Timed out
```

3.324.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))^3/(e*x^3+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.324.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx = \int \frac{(b\log(cx^n)+a)^3}{(ex^3+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^3/(e*x^3+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^3/(e*x^3 + d)^2, x)
```

3.324.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^3}{(d+ex^3)^2}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^3}{(e\,x^3+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^3/(d + e*x^3)^2,x)
```

output
```
int((a + b*log(c*x^n))^3/(d + e*x^3)^2, x)
```

3.325 $\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx$

3.325.1 Optimal result

Integrand size = 22, antiderivative size = 860

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx = \frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)} - \frac{\sqrt[3]{-1}x(a+b\log(cx^n))^2}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}x\right)} + \frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)} - \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{9d^{5/3}\sqrt[3]{e}} + \frac{2(a+b\log(cx^n))^2\log\left(1+\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{9d^{5/3}\sqrt[3]{e}} + \frac{2\sqrt[3]{-1}bn(a+b\log(cx^n))\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}} - \frac{2i\sqrt{3}(a+b\log(cx^n))^2\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}} + \frac{2\sqrt[3]{-1}bn(a+b\log(cx^n))\log\left(1+\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{9d^{5/3}\sqrt[3]{e}} + \frac{2(a+b\log(cx^n))^2\log\left(1+\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}} - \frac{2b^2n^2\,\mathrm{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{9d^{5/3}\sqrt[3]{e}} + \frac{4bn(a+b\log(cx^n))\,\mathrm{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{9d^{5/3}\sqrt[3]{e}} + \frac{2\sqrt[3]{-1}b^2n^2\,\mathrm{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}} - \frac{4i\sqrt{3}bn(a+b\log(cx^n))\,\mathrm{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}} + \frac{2\sqrt[3]{-1}b^2n^2\,\mathrm{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{9d^{5/3}\sqrt[3]{e}}$$

$$4bn(a+b\log(cx^n))\,\mathrm{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)$$

output
```
1/9*x*(a+b*ln(c*x^n))^2/d^(5/3)/(d^(1/3)+e^(1/3)*x)-(-1)^(1/3)*x*(a+b*ln(c
*x^n))^2/(1+(-1)^(1/3))^4/d^(5/3)/((-1)^(2/3)*d^(1/3)+e^(1/3)*x)+1/9*x*(a+
b*ln(c*x^n))^2/d^(5/3)/(d^(1/3)+(-1)^(2/3)*e^(1/3)*x)-2/9*b*n*(a+b*ln(c*x^
n))*ln(1+e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2/9*(a+b*ln(c*x^n))^2*ln(1+e^(
1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2*(-1)^(1/3)*b*n*(a+b*ln(c*x^n))*ln(1-(-1)
^(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)+2/9*(-1)^(1/3)*
b*n*(a+b*ln(c*x^n))*ln(1+(-1)^(2/3)*e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-2/9
*b^2*n^2*polylog(2,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+4/9*b*n*(a+b*ln(c*x
^n))*polylog(2,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)+2*(-1)^(1/3)*b^2*n^2*po
lylog(2,(-1)^(1/3)*e^(1/3)*x/d^(1/3))/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)+2/9
*(-1)^(1/3)*b^2*n^2*polylog(2,-(-1)^(2/3)*e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/
3)-4/9*b^2*n^2*polylog(3,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-4/9*(a+b*ln(c
*x^n))^2*ln(1-1/2*e^(1/3)*x*(1-I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1-I*3^
(1/2))-8/9*b*n*(a+b*ln(c*x^n))*polylog(2,1/2*e^(1/3)*x*(1-I*3^(1/2))/d^(1/
3))/d^(5/3)/e^(1/3)/(1-I*3^(1/2))+8/9*b^2*n^2*polylog(3,1/2*e^(1/3)*x*(1-I
*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1-I*3^(1/2))-4/9*(a+b*ln(c*x^n))^2*ln(
1-1/2*e^(1/3)*x*(1+I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1+I*3^(1/2))-8/9*b
*n*(a+b*ln(c*x^n))*polylog(2,1/2*e^(1/3)*x*(1+I*3^(1/2))/d^(1/3))/d^(5/3)/
e^(1/3)/(1+I*3^(1/2))+8/9*b^2*n^2*polylog(3,1/2*e^(1/3)*x*(1+I*3^(1/2))/d^
(1/3))/d^(5/3)/e^(1/3)/(1+I*3^(1/2))
```

3.325.2 Mathematica [A] (verified)

Time = 2.72 (sec) , antiderivative size = 1180, normalized size of antiderivative = 1.37

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx = \text{Too large to display}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(d + e*x^3)^2,x]
```

output
```
((3*d^(2/3)*x*(a - b*n*Log[x] + b*Log[c*x^n])^2)/(d + e*x^3) + (2*Sqrt[3]*
ArcTan[(-d^(1/3) + 2*e^(1/3)*x)/(Sqrt[3]*d^(1/3))]*(a - b*n*Log[x] + b*Log
[c*x^n])^2)/e^(1/3) + (2*(a - b*n*Log[x] + b*Log[c*x^n])^2*Log[d^(1/3) + e
^(1/3)*x])/e^(1/3) - ((a - b*n*Log[x] + b*Log[c*x^n])^2*Log[d^(2/3) - d^(1
/3)*e^(1/3)*x + e^(2/3)*x^2])/e^(1/3) + (6*b*n*(a - b*n*Log[x] + b*Log[c*x
^n])*(((-1 + (-1)^(1/3))*((-1)^(1/3)*e^(1/3)*x*Log[x] + (d^(1/3) - (-1)^(1
/3)*e^(1/3)*x)*Log[-((-1)^(2/3)*d^(1/3)) - e^(1/3)*x]))/((-1)^(2/3)*d^(1/3
)*e^(1/3) + e^(2/3)*x) + (-1)^(1/3)*((x*Log[x])/(d^(1/3) + e^(1/3)*x) - Lo
g[d^(1/3) + e^(1/3)*x]/e^(1/3)) + (-((-1)^(2/3)*e^(1/3)*x*Log[x]) + (d^(1/
3) + (-1)^(2/3)*e^(1/3)*x)*Log[d^(1/3) + (-1)^(2/3)*e^(1/3)*x])/(-((-1)^(1
/3)*d^(1/3)*e^(1/3)) + e^(2/3)*x) + (2*(-1)^(1/3)*(Log[x]*Log[1 + (e^(1/3)
*x)/d^(1/3)] + PolyLog[2, -((e^(1/3)*x)/d^(1/3))]))/e^(1/3) - (2*(Log[x]*L
og[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)] + PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)
/d^(1/3)]))/e^(1/3) - (2*(-1 + (-1)^(1/3))*(Log[x]*Log[1 + ((-1)^(2/3)*e^(
1/3)*x)/d^(1/3)] + PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))]))/e^(1/3)
))/(1 + (-1)^(1/3))^2 + (3*b^2*n^2*(((-1)^(1/3)*(Log[x]*((e^(1/3)*x*Log[x]
)/(d^(1/3) + e^(1/3)*x) - 2*Log[1 + (e^(1/3)*x)/d^(1/3)]) - 2*PolyLog[2, -
((e^(1/3)*x)/d^(1/3))]))/e^(1/3) - ((-1 + (-1)^(1/3))*d^(1/3)*(Log[x]*((-(
(-1)^(1/3)/d^(1/3)) - ((-1)^(2/3)*d^(1/3) + e^(1/3)*x)^(-1))*Log[x] + (2*(
-1)^(1/3)*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/d^(1/3)) + (2*(-1)^(...
```

3.325.3 Rubi [A] (verified)

Time = 1.15 (sec) , antiderivative size = 860, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(\frac{2(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}-\frac{2(-1)^{5/6}\sqrt{3}(a+b\log(cx^n))^2}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\left(\sqrt[3]{-1}\sqrt[3]{e}x-\sqrt[3]{d}\right)}+\frac{2(-1)^{2/3}(a+b\log(cx^n))^2}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)}+\frac{(a-}{9d^{4/3}}\right.$$

$$\Big\downarrow \text{2009}$$

$$-\frac{2b^2 \text{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{9d^{5/3}\sqrt[3]{e}}+\frac{2\sqrt[3]{-1}b^2 \text{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}+\frac{2\sqrt[3]{-1}b^2 \text{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{9d^{5/3}\sqrt[3]{e}}-\frac{4b^2 \text{PolyLog}\left(3,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{9d^{5/3}\sqrt[3]{e}}+\frac{4i\sqrt{3}b^2 \text{PolyLog}\left(3,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}}-\frac{4b^2 \text{PolyLog}\left(3,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n^2}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}-\frac{2b(a+b\log(cx^n))\log\left(\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)n}{9d^{5/3}\sqrt[3]{e}}+\frac{2\sqrt[3]{-1}b(a+b\log(cx^n))\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}+\frac{2\sqrt[3]{-1}b(a+b\log(cx^n))\log\left(\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)n}{9d^{5/3}\sqrt[3]{e}}+\frac{4b(a+b\log(cx^n))\text{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{9d^{5/3}\sqrt[3]{e}}-\frac{4i\sqrt{3}b(a+b\log(cx^n))\text{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}}+\frac{4b(a+b\log(cx^n))\text{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)n}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}+\frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left(\sqrt[3]{e}x+\sqrt[3]{d}\right)}-\frac{\sqrt[3]{-1}x(a+b\log(cx^n))^2}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left(\sqrt[3]{e}x+(-1)^{2/3}\sqrt[3]{d}\right)}+\frac{x(a+b\log(cx^n))^2}{9d^{5/3}\left((-1)^{2/3}\sqrt[3]{e}x+\sqrt[3]{d}\right)}+\frac{2(a+b\log(cx^n))^2\log\left(\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)}{9d^{5/3}\sqrt[3]{e}}-\frac{2i\sqrt{3}(a+b\log(cx^n))^2\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}}+\frac{2(a+b\log(cx^n))^2\log\left(\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}$$

input
```
Int[(a + b*Log[c*x^n])^2/(d + e*x^3)^2,x]
```

3.325. $\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx$

output
```
(x*(a + b*Log[c*x^n])^2)/(9*d^(5/3)*(d^(1/3) + e^(1/3)*x)) - ((-1)^(1/3)*x
*(a + b*Log[c*x^n])^2)/((1 + (-1)^(1/3))^4*d^(5/3)*((-1)^(2/3)*d^(1/3) + e
^(1/3)*x)) + (x*(a + b*Log[c*x^n])^2)/(9*d^(5/3)*(d^(1/3) + (-1)^(2/3)*e^(
1/3)*x)) - (2*b*n*(a + b*Log[c*x^n])*Log[1 + (e^(1/3)*x)/d^(1/3)])/(9*d^(5
/3)*e^(1/3)) + (2*(a + b*Log[c*x^n])^2*Log[1 + (e^(1/3)*x)/d^(1/3)])/(9*d^
(5/3)*e^(1/3)) + (2*(-1)^(1/3)*b*n*(a + b*Log[c*x^n])*Log[1 - ((-1)^(1/3)*
e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) - ((2*I)*Sqrt[3]
*(a + b*Log[c*x^n])^2*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^
(1/3))^5*d^(5/3)*e^(1/3)) + (2*(-1)^(1/3)*b*n*(a + b*Log[c*x^n])*Log[1 + (
(-1)^(2/3)*e^(1/3)*x)/d^(1/3)])/(9*d^(5/3)*e^(1/3)) + (2*(a + b*Log[c*x^n]
)^2*Log[1 + ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e
^(1/3)) - (2*b^2*n^2*PolyLog[2, -((e^(1/3)*x)/d^(1/3))])/(9*d^(5/3)*e^(1/3
)) + (4*b*n*(a + b*Log[c*x^n])*PolyLog[2, -((e^(1/3)*x)/d^(1/3))])/(9*d^(5
/3)*e^(1/3)) + (2*(-1)^(1/3)*b^2*n^2*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(
1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) - ((4*I)*Sqrt[3]*b*n*(a + b*Lo
g[c*x^n])*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^5*
d^(5/3)*e^(1/3)) + (2*(-1)^(1/3)*b^2*n^2*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*
x)/d^(1/3))])/(9*d^(5/3)*e^(1/3)) + (4*b*n*(a + b*Log[c*x^n])*PolyLog[2, -
(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) -
(4*b^2*n^2*PolyLog[3, -((e^(1/3)*x)/d^(1/3))])/(9*d^(5/3)*e^(1/3)) + ((...
```

3.325.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

3.325.4 Maple [F]

$$\int \frac{(a+b\ln(c\,x^n))^2}{(e\,x^3+d)^2}dx$$

input
```
int((a+b*ln(c*x^n))^2/(e*x^3+d)^2,x)
```

output
```
int((a+b*ln(c*x^n))^2/(e*x^3+d)^2,x)
```

3.325.5 Fricas [F]

$$\int \frac{(a + b\log(cx^n))^2}{(d + ex^3)^2}\,dx = \int \frac{(b\log(cx^n) + a)^2}{(ex^3 + d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x^3+d)^2,x, algorithm="fricas")
```

output
```
integral((b^2*log(c*x^n)^2 + 2*a*b*log(c*x^n) + a^2)/(e^2*x^6 + 2*d*e*x^3
+ d^2), x)
```

3.325.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(a + b\log(cx^n))^2}{(d + ex^3)^2}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))**2/(e*x**3+d)**2,x)
```

output
```
Timed out
```

3.325.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(a + b\log(cx^n))^2}{(d + ex^3)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x^3+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.325.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^3+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/(e*x^3+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/(e*x^3 + d)^2, x)
```

3.325.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{(d+ex^3)^2}\,dx = \int \frac{(a+b\ln(c\,x^n))^2}{(e\,x^3+d)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(d + e*x^3)^2,x)
```

output
```
int((a + b*log(c*x^n))^2/(d + e*x^3)^2, x)
```

3.326 $\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx$

3.326.1 Optimal result

Integrand size = 20, antiderivative size = 520

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx = \frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)} - \frac{\sqrt[3]{-1}x(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}x\right)} + \frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)} + \frac{\sqrt[3]{-1}bn\log\left(-(-1)^{2/3}\sqrt[3]{d}-\sqrt[3]{e}x\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}} - \frac{bn\log\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}{9d^{5/3}\sqrt[3]{e}} + \frac{\sqrt[3]{-1}bn\log\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)}{9d^{5/3}\sqrt[3]{e}} + \frac{2(a+b\log(cx^n))\log\left(1+\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{9d^{5/3}\sqrt[3]{e}} - \frac{2i\sqrt{3}(a+b\log(cx^n))\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}} + \frac{2(a+b\log(cx^n))\log\left(1+\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}} + \frac{2bn\,\text{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{9d^{5/3}\sqrt[3]{e}} - \frac{2i\sqrt{3}bn\,\text{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}} + \frac{2bn\,\text{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}$$

output
```
1/9*x*(a+b*ln(c*x^n))/d^(5/3)/(d^(1/3)+e^(1/3)*x)-(-1)^(1/3)*x*(a+b*ln(c*x
^n))/(1+(-1)^(1/3))^4/d^(5/3)/((-1)^(2/3)*d^(1/3)+e^(1/3)*x)+1/9*x*(a+b*ln
(c*x^n))/d^(5/3)/(d^(1/3)+(-1)^(2/3)*e^(1/3)*x)+(-1)^(1/3)*b*n*ln(-(-1)^(2
/3)*d^(1/3)-e^(1/3)*x)/(1+(-1)^(1/3))^4/d^(5/3)/e^(1/3)-1/9*b*n*ln(d^(1/3)
+e^(1/3)*x)/d^(5/3)/e^(1/3)+1/9*(-1)^(1/3)*b*n*ln(d^(1/3)+(-1)^(2/3)*e^(1/
3)*x)/d^(5/3)/e^(1/3)+2/9*(a+b*ln(c*x^n))*ln(1+e^(1/3)*x/d^(1/3))/d^(5/3)/
e^(1/3)+2/9*b*n*polylog(2,-e^(1/3)*x/d^(1/3))/d^(5/3)/e^(1/3)-4/9*(a+b*ln(
c*x^n))*ln(1-1/2*e^(1/3)*x*(1-I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1-I*3^(
1/2))-4/9*b*n*polylog(2,1/2*e^(1/3)*x*(1-I*3^(1/2))/d^(1/3))/d^(5/3)/e^(1/
3)/(1-I*3^(1/2))-4/9*(a+b*ln(c*x^n))*ln(1-1/2*e^(1/3)*x*(1+I*3^(1/2))/d^(1
/3))/d^(5/3)/e^(1/3)/(1+I*3^(1/2))-4/9*b*n*polylog(2,1/2*e^(1/3)*x*(1+I*3^
(1/2))/d^(1/3))/d^(5/3)/e^(1/3)/(1+I*3^(1/2))
```

3.326.2 Mathematica [A] (verified)

Time = 0.83 (sec) , antiderivative size = 571, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx$$

$$= \frac{\frac{3d^{2/3}x(a-bn\log(x)+b\log(cx^n))}{d+ex^3} - \frac{2\sqrt{3}\arctan\left(\frac{1-\frac{2\sqrt[3]{e}x}{\sqrt[3]{d}}}{\sqrt{3}}\right)(a-bn\log(x)+b\log(cx^n))}{\sqrt[3]{e}} + \frac{2(a-bn\log(x)+b\log(cx^n))\log\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}{\sqrt[3]{e}} - }{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^3)^2,x]
```

output
```
((3*d^(2/3)*x*(a - b*n*Log[x] + b*Log[c*x^n]))/(d + e*x^3) - (2*Sqrt[3]*Ar
cTan[(1 - (2*e^(1/3)*x)/d^(1/3))/Sqrt[3]]*(a - b*n*Log[x] + b*Log[c*x^n]))
/e^(1/3) + (2*(a - b*n*Log[x] + b*Log[c*x^n])*Log[d^(1/3) + e^(1/3)*x])/e^
(1/3) - ((a - b*n*Log[x] + b*Log[c*x^n])*Log[d^(2/3) - d^(1/3)*e^(1/3)*x +
 e^(2/3)*x^2])/e^(1/3) + (3*b*n*(((-1 + (-1)^(1/3))*((-1)^(1/3)*e^(1/3)*x*
Log[x] + (d^(1/3) - (-1)^(1/3)*e^(1/3)*x)*Log[-((-1)^(2/3)*d^(1/3)) - e^(1
/3)*x]))/((-1)^(2/3)*d^(1/3)*e^(1/3) + e^(2/3)*x) + (-1)^(1/3)*((x*Log[x])
/(d^(1/3) + e^(1/3)*x) - Log[d^(1/3) + e^(1/3)*x]/e^(1/3)) + (-((-1)^(2/3)
*e^(1/3)*x*Log[x]) + (d^(1/3) + (-1)^(2/3)*e^(1/3)*x)*Log[d^(1/3) + (-1)^(
2/3)*e^(1/3)*x])/(-((-1)^(1/3)*d^(1/3)*e^(1/3)) + e^(2/3)*x) + (2*(-1)^(1/
3)*(Log[x]*Log[1 + (e^(1/3)*x)/d^(1/3)] + PolyLog[2, -((e^(1/3)*x)/d^(1/3)
)]))/e^(1/3) - (2*(Log[x]*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)] + PolyLo
g[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)]))/e^(1/3) - (2*(-1 + (-1)^(1/3))*(Log
[x]*Log[1 + ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)] + PolyLog[2, -(((-1)^(2/3)*e^(
1/3)*x)/d^(1/3))]))/e^(1/3)))/(1 + (-1)^(1/3))^2)/(9*d^(5/3))
```

3.326.3 Rubi [A] (verified)

Time = 0.78 (sec) , antiderivative size = 520, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.100$, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(\frac{2(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}-\frac{2(-1)^{5/6}\sqrt{3}(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\left(\sqrt[3]{-1}\sqrt[3]{e}x-\sqrt[3]{d}\right)}+\frac{2(-1)^{2/3}(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)}+\frac{a}{9d^{4/3}}\right.$$

$$\Big\downarrow \text{2009}$$

$$\frac{2\log\left(\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)(a+b\log(cx^n))}{9d^{5/3}\sqrt[3]{e}}-\frac{2i\sqrt{3}\log\left(1-\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}}+\frac{2\log\left(\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}+1\right)(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}+\frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}-\frac{\sqrt[3]{-1}x(a+b\log(cx^n))}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\left((-1)^{2/3}\sqrt[3]{d}+\sqrt[3]{e}x\right)}+\frac{x(a+b\log(cx^n))}{9d^{5/3}\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)}+\frac{2bn\,\text{PolyLog}\left(2,-\frac{\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{9d^{5/3}\sqrt[3]{e}}-\frac{2i\sqrt{3}bn\,\text{PolyLog}\left(2,\frac{\sqrt[3]{-1}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^5 d^{5/3}\sqrt[3]{e}}+\frac{2bn\,\text{PolyLog}\left(2,-\frac{(-1)^{2/3}\sqrt[3]{e}x}{\sqrt[3]{d}}\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}+\frac{\sqrt[3]{-1}bn\log\left(-(-1)^{2/3}\sqrt[3]{d}-\sqrt[3]{e}x\right)}{\left(1+\sqrt[3]{-1}\right)^4 d^{5/3}\sqrt[3]{e}}-\frac{bn\log\left(\sqrt[3]{d}+\sqrt[3]{e}x\right)}{9d^{5/3}\sqrt[3]{e}}+\frac{\sqrt[3]{-1}bn\log\left(\sqrt[3]{d}+(-1)^{2/3}\sqrt[3]{e}x\right)}{9d^{5/3}\sqrt[3]{e}}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^3)^2,x]
```

3.326. $\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx$

output
```
(x*(a + b*Log[c*x^n]))/(9*d^(5/3)*(d^(1/3) + e^(1/3)*x)) - ((-1)^(1/3)*x*(
a + b*Log[c*x^n]))/((1 + (-1)^(1/3))^4*d^(5/3)*((-1)^(2/3)*d^(1/3) + e^(1/
3)*x)) + (x*(a + b*Log[c*x^n]))/(9*d^(5/3)*(d^(1/3) + (-1)^(2/3)*e^(1/3)*x
)) + ((-1)^(1/3)*b*n*Log[-((-1)^(2/3)*d^(1/3)) - e^(1/3)*x])/((1 + (-1)^(1
/3))^4*d^(5/3)*e^(1/3)) - (b*n*Log[d^(1/3) + e^(1/3)*x])/(9*d^(5/3)*e^(1/3
)) + ((-1)^(1/3)*b*n*Log[d^(1/3) + (-1)^(2/3)*e^(1/3)*x])/(9*d^(5/3)*e^(1/
3)) + (2*(a + b*Log[c*x^n])*Log[1 + (e^(1/3)*x)/d^(1/3)])/(9*d^(5/3)*e^(1/
3)) - ((2*I)*Sqrt[3]*(a + b*Log[c*x^n])*Log[1 - ((-1)^(1/3)*e^(1/3)*x)/d^(
1/3)])/((1 + (-1)^(1/3))^5*d^(5/3)*e^(1/3)) + (2*(a + b*Log[c*x^n])*Log[1
+ ((-1)^(2/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3)) +
(2*b*n*PolyLog[2, -((e^(1/3)*x)/d^(1/3))])/(9*d^(5/3)*e^(1/3)) - ((2*I)*Sq
rt[3]*b*n*PolyLog[2, ((-1)^(1/3)*e^(1/3)*x)/d^(1/3)])/((1 + (-1)^(1/3))^5*
d^(5/3)*e^(1/3)) + (2*b*n*PolyLog[2, -(((-1)^(2/3)*e^(1/3)*x)/d^(1/3))])/(
(1 + (-1)^(1/3))^4*d^(5/3)*e^(1/3))
```

3.326.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

3.326.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.13 (sec) , antiderivative size = 598, normalized size of antiderivative = 1.15

method	result
risch	$\frac{bx\ln(x^n)}{3d(e\,x^3+d)}-\frac{2b\ln\left(x+\left(\frac{d}{e}\right)^{\frac{1}{3}}\right)n\ln(x)}{9e\left(\frac{d}{e}\right)^{\frac{2}{3}}d}+\frac{2b\ln\left(x+\left(\frac{d}{e}\right)^{\frac{1}{3}}\right)\ln(x^n)}{9e\left(\frac{d}{e}\right)^{\frac{2}{3}}d}+\frac{b\ln\left(x^2-\left(\frac{d}{e}\right)^{\frac{1}{3}}x+\left(\frac{d}{e}\right)^{\frac{2}{3}}\right)n\ln(x)}{9e\left(\frac{d}{e}\right)^{\frac{2}{3}}d}-\frac{b\ln\left(x^2-\left(\frac{d}{e}\right)^{\frac{1}{3}}x+\right.}{9e\left(\frac{d}{e}\right.}$

input
```
int((a+b*ln(c*x^n))/(e*x^3+d)^2,x,method=_RETURNVERBOSE)
```

output
```
1/3*b*x/d/(e*x^3+d)*ln(x^n)-2/9*b/e/(d/e)^(2/3)*ln(x+(d/e)^(1/3))/d*n*ln(x
)+2/9*b/e/(d/e)^(2/3)*ln(x+(d/e)^(1/3))/d*ln(x^n)+1/9*b/e/(d/e)^(2/3)*ln(x
^2-(d/e)^(1/3)*x+(d/e)^(2/3))/d*n*ln(x)-1/9*b/e/(d/e)^(2/3)*ln(x^2-(d/e)^(
1/3)*x+(d/e)^(2/3))/d*ln(x^n)-2/9*b/e/(d/e)^(2/3)*3^(1/2)*arctan(1/3*3^(1/
2)*(2/(d/e)^(1/3)*x-1))/d*n*ln(x)+2/9*b/e/(d/e)^(2/3)*3^(1/2)*arctan(1/3*3
^(1/2)*(2/(d/e)^(1/3)*x-1))/d*ln(x^n)-1/9*b*n/e/(d/e)^(2/3)*ln(x+(d/e)^(1/
3))/d+1/18*b*n/e/(d/e)^(2/3)*ln(x^2-(d/e)^(1/3)*x+(d/e)^(2/3))/d-1/9*b*n/e
/(d/e)^(2/3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(d/e)^(1/3)*x-1))/d+2/9*b*n/e/d
*sum(1/_R2^2*(ln(x)*ln((_R2-x)/_R2)+dilog((_R2-x)/_R2)),_R2=RootOf(_Z^3*e+
d))+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*
csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c
*x^n)^3+b*ln(c)+a)*(1/3*x/d/(e*x^3+d)+2/3/d*(1/3/e/(d/e)^(2/3)*ln(x+(d/e)^
(1/3))-1/6/e/(d/e)^(2/3)*ln(x^2-(d/e)^(1/3)*x+(d/e)^(2/3))+1/3/e/(d/e)^(2/
3)*3^(1/2)*arctan(1/3*3^(1/2)*(2/(d/e)^(1/3)*x-1))))
```

3.326.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx=\int \frac{b\log(cx^n)+a}{(ex^3+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^3+d)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^6 + 2*d*e*x^3 + d^2), x)
```

3.326.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx = \int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(e*x**3+d)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**3)**2, x)
```

3.326.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((a+b*log(c*x^n))/(e*x^3+d)^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(e>0)', see `assume?` for more de
tails)Is e
```

3.326.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{(d+ex^3)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex^3+d)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(e*x^3+d)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^3 + d)^2, x)
```

3.326.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^3\right)^2}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{\left(e\,x^3+d\right)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^3)^2,x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^3)^2, x)
```

3.327 $\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))}\,dx$

3.327.1 Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))}\,dx = \text{Int}\left(\frac{1}{(d+ex^3)^2(a+b\log(cx^n))},x\right)$$

output
```
Unintegrable(1/(e*x^3+d)^2/(a+b*ln(c*x^n)),x)
```

3.327.2 Mathematica [N/A]

Not integrable

Time = 3.85 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))}\,dx = \int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))}\,dx$$

input
```
Integrate[1/((d + e*x^3)^2*(a + b*Log[c*x^n])),x]
```

output
```
Integrate[1/((d + e*x^3)^2*(a + b*Log[c*x^n])), x]
```

3.327.3 Rubi [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))} \, dx$$
$$\Big\downarrow \; 2768$$
$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))}dx$$

input
```
Int[1/((d + e*x^3)^2*(a + b*Log[c*x^n])),x]
```

output
```
$Aborted
```

3.327.3.1 Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

3.327.4 Maple [N/A]

Not integrable

Time = 0.01 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(e\,x^3+d)^2 (a+b\ln(c\,x^n))}dx$$

input
```
int(1/(e*x^3+d)^2/(a+b*ln(c*x^n)),x)
```

output
```
int(1/(e*x^3+d)^2/(a+b*ln(c*x^n)),x)
```

3.327.5 Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.50

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))}\,dx = \int \frac{1}{(ex^3+d)^2(b\log(cx^n)+a)}\,dx$$

input
```
integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral(1/(a*e^2*x^6 + 2*a*d*e*x^3 + a*d^2 + (b*e^2*x^6 + 2*b*d*e*x^3 + b
*d^2)*log(c*x^n)), x)
```

3.327.6 Sympy [N/A]

Not integrable

Time = 0.00 (sec) , antiderivative size = 1, normalized size of antiderivative = 0.05

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))}\,dx = \int \frac{1}{(a+b\log(cx^n))\,(d+ex^3)^2}\,dx$$

input
```
integrate(1/(e*x**3+d)**2/(a+b*ln(c*x**n)),x)
```

output
```
integrate(1/(e*x**3+d)**2/(a+b*ln(c*x**n)),x)
```

3.327.7 Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))}\,dx = \int \frac{1}{(ex^3+d)^2(b\log(cx^n)+a)}\,dx$$

input
```
integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate(1/((e*x^3 + d)^2*(b*log(c*x^n) + a)), x)
```

3.327.8 Giac [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))} \, dx = \int \frac{1}{(ex^3+d)^2 (b\log(cx^n)+a)} \, dx$$

input
```
integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate(1/((e*x^3 + d)^2*(b*log(c*x^n) + a)), x)
```

3.327.9 Mupad [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))} \, dx = \int \frac{1}{(e\,x^3+d)^2\,(a+b\,\ln(c\,x^n))} \, dx$$

input
```
int(1/((d + e*x^3)^2*(a + b*log(c*x^n))),x)
```

output
```
int(1/((d + e*x^3)^2*(a + b*log(c*x^n))), x)
```

3.328 $\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))^2}\,dx$

3.328.1 Optimal result

Integrand size = 22, antiderivative size = 22

$$\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))^2}\,dx = \text{Int}\left(\frac{1}{(d+ex^3)^2(a+b\log(cx^n))^2},x\right)$$

output
```
Unintegrable(1/(e*x^3+d)^2/(a+b*ln(c*x^n))^2,x)
```

3.328.2 Mathematica [N/A]

Not integrable

Time = 17.20 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))^2}\,dx = \int \frac{1}{(d+ex^3)^2(a+b\log(cx^n))^2}\,dx$$

input
```
Integrate[1/((d + e*x^3)^2*(a + b*Log[c*x^n])^2),x]
```

output
```
Integrate[1/((d + e*x^3)^2*(a + b*Log[c*x^n])^2), x]
```

3.328.3 Rubi [N/A]

Not integrable

Time = 0.19 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2} \, dx$$
$$\Big\downarrow \text{2768}$$
$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2}dx$$

input
```
Int[1/((d + e*x^3)^2*(a + b*Log[c*x^n])^2),x]
```

output
```
$Aborted
```

3.328.3.1 Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

3.328.4 Maple [N/A]

Not integrable

Time = 0.04 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.00

$$\int \frac{1}{(e\,x^3+d)^2 (a+b\ln(c\,x^n))^2}dx$$

input
```
int(1/(e*x^3+d)^2/(a+b*ln(c*x^n))^2,x)
```

output
```
int(1/(e*x^3+d)^2/(a+b*ln(c*x^n))^2,x)
```

3.328.5 Fricas [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 102, normalized size of antiderivative = 4.64

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2} dx = \int \frac{1}{(ex^3+d)^2(b\log(cx^n)+a)^2} dx$$

input
```
integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
integral(1/(a^2*e^2*x^6 + 2*a^2*d*e*x^3 + a^2*d^2 + (b^2*e^2*x^6 + 2*b^2*d
*e*x^3 + b^2*d^2)*log(c*x^n)^2 + 2*(a*b*e^2*x^6 + 2*a*b*d*e*x^3 + a*b*d^2)
*log(c*x^n)), x)
```

3.328.6 Sympy [N/A]

Not integrable

Time = 0.00 (sec) , antiderivative size = 1, normalized size of antiderivative = 0.05

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2} dx = \int \frac{1}{(a+b\log(cx^n))^2 (d+ex^3)^2} dx$$

input
```
integrate(1/(e*x**3+d)**2/(a+b*ln(c*x**n))**2,x)
```

output
```
integrate(1/(e*x**3+d)**2/(a+b*ln(c*x**n))**2,x)
```

3.328.7 Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 261, normalized size of antiderivative = 11.86

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2} dx = \int \frac{1}{(ex^3+d)^2(b\log(cx^n)+a)^2} dx$$

input
```
integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
-x/((b^2*e^2*n*log(c) + a*b*e^2*n)*x^6 + b^2*d^2*n*log(c) + a*b*d^2*n + 2*
(b^2*d*e*n*log(c) + a*b*d*e*n)*x^3 + (b^2*e^2*n*x^6 + 2*b^2*d*e*n*x^3 + b^
2*d^2*n)*log(x^n)) - integrate((5*e*x^3 - d)/((b^2*e^3*n*log(c) + a*b*e^3*
n)*x^9 + 3*(b^2*d*e^2*n*log(c) + a*b*d*e^2*n)*x^6 + b^2*d^3*n*log(c) + a*b
*d^3*n + 3*(b^2*d^2*e*n*log(c) + a*b*d^2*e*n)*x^3 + (b^2*e^3*n*x^9 + 3*b^2
*d*e^2*n*x^6 + 3*b^2*d^2*e*n*x^3 + b^2*d^3*n)*log(x^n)), x)
```

3.328.8 Giac [N/A]

Not integrable

Time = 0.33 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2} dx = \int \frac{1}{(ex^3+d)^2(b\log(cx^n)+a)^2} dx$$

input
```
integrate(1/(e*x^3+d)^2/(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
integrate(1/((e*x^3 + d)^2*(b*log(c*x^n) + a)^2), x)
```

3.328.9 Mupad [N/A]

Not integrable

Time = 0.39 (sec) , antiderivative size = 24, normalized size of antiderivative = 1.09

$$\int \frac{1}{(d+ex^3)^2 (a+b\log(cx^n))^2} dx = \int \frac{1}{(e\,x^3+d)^2 \left(a+b\,\ln(c\,x^n)\right)^2} dx$$

input
```
int(1/((d + e*x^3)^2*(a + b*log(c*x^n))^2),x)
```

output
```
int(1/((d + e*x^3)^2*(a + b*log(c*x^n))^2), x)
```

3.329 $\int \frac{x^3(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$

3.329.1 Optimal result

Integrand size = 23, antiderivative size = 185

$$\int \frac{x^3(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = -\frac{ae^3x}{d^4}+\frac{be^3nx}{d^4}-\frac{be^2nx^2}{4d^3}+\frac{benx^3}{9d^2}-\frac{bnx^4}{16d}-\frac{be^3x\log(cx^n)}{d^4}+\frac{e^2x^2(a+b\log(cx^n))}{2d^3}-\frac{ex^3(a+b\log(cx^n))}{3d^2}+\frac{x^4(a+b\log(cx^n))}{4d}+\frac{e^4(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d^5}+\frac{be^4n\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^5}$$

output
```
-a*e^3*x/d^4+b*e^3*n*x/d^4-1/4*b*e^2*n*x^2/d^3+1/9*b*e*n*x^3/d^2-1/16*b*n*
x^4/d-b*e^3*x*ln(c*x^n)/d^4+1/2*e^2*x^2*(a+b*ln(c*x^n))/d^3-1/3*e*x^3*(a+b
*ln(c*x^n))/d^2+1/4*x^4*(a+b*ln(c*x^n))/d+e^4*(a+b*ln(c*x^n))*ln(1+d*x/e)/
d^5+b*e^4*n*polylog(2,-d*x/e)/d^5
```

3.329.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 171, normalized size of antiderivative = 0.92

$$\int \frac{x^3(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$$
$$= \frac{-144ade^3x+144bde^3nx-36bd^2e^2nx^2+16bd^3enx^3-9bd^4nx^4-144bde^3x\log(cx^n)+72d^2e^2x^2(a+b\log}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e/x),x]
```

output
```
(-144*a*d*e^3*x + 144*b*d*e^3*n*x - 36*b*d^2*e^2*n*x^2 + 16*b*d^3*e*n*x^3
- 9*b*d^4*n*x^4 - 144*b*d*e^3*x*Log[c*x^n] + 72*d^2*e^2*x^2*(a + b*Log[c*x
^n]) - 48*d^3*e*x^3*(a + b*Log[c*x^n]) + 36*d^4*x^4*(a + b*Log[c*x^n]) + 1
44*e^4*(a + b*Log[c*x^n])*Log[1 + (d*x)/e] + 144*b*e^4*n*PolyLog[2, -((d*x
)/e)])/(144*d^5)
```

3.329.3 Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 185, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {2005, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$$
$$\Big\downarrow \text{2005}$$
$$\int \frac{x^4(a+b\log(cx^n))}{dx+e}dx$$
$$\Big\downarrow \text{2793}$$
$$\int \left(\frac{e^4(a+b\log(cx^n))}{d^4(dx+e)}-\frac{e^3(a+b\log(cx^n))}{d^4}+\frac{e^2x(a+b\log(cx^n))}{d^3}-\frac{ex^2(a+b\log(cx^n))}{d^2}+\frac{x^3(a+b\log(cx^n))}{d}\right.$$
$$\Big\downarrow \text{2009}$$

$$\frac{e^4 \log \left(\frac{dx}{e}+1\right) (a+b\log(cx^n))}{d^5}+\frac{e^2x^2(a+b\log(cx^n))}{2d^3}-\frac{ex^3(a+b\log(cx^n))}{3d^2}+\frac{x^4(a+b\log(cx^n))}{4d}-\frac{ae^3x}{d^4}-\frac{be^3x\log(cx^n)}{d^4}+\frac{be^4n\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^5}+\frac{be^3nx}{d^4}-\frac{be^2nx^2}{4d^3}+\frac{benx^3}{9d^2}-\frac{bnx^4}{16d}$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e/x),x]
```

output
```
-((a*e^3*x)/d^4) + (b*e^3*n*x)/d^4 - (b*e^2*n*x^2)/(4*d^3) + (b*e*n*x^3)/(
9*d^2) - (b*n*x^4)/(16*d) - (b*e^3*x*Log[c*x^n])/d^4 + (e^2*x^2*(a + b*Log
[c*x^n]))/(2*d^3) - (e*x^3*(a + b*Log[c*x^n]))/(3*d^2) + (x^4*(a + b*Log[c
*x^n]))/(4*d) + (e^4*(a + b*Log[c*x^n])*Log[1 + (d*x)/e])/d^5 + (b*e^4*n*P
olyLog[2, -((d*x)/e)])/d^5
```

3.329.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
 + n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.329.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.34 (sec) , antiderivative size = 313, normalized size of antiderivative = 1.69

method	result
risch	$\frac{b\ln(x^n)x^4}{4d}-\frac{b\ln(x^n)e\,x^3}{3d^2}+\frac{b\ln(x^n)x^2e^2}{2d^3}-\frac{b\ln(x^n)x\,e^3}{d^4}+\frac{b\ln(x^n)e^4\ln(dx+e)}{d^5}-\frac{bn\,e^4\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{d^5}-\frac{bn\,e^4\,\text{dilog}(}{d^5}$

input
```
int(x^3*(a+b*ln(c*x^n))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
1/4*b*ln(x^n)/d*x^4-1/3*b*ln(x^n)/d^2*e*x^3+1/2*b*ln(x^n)/d^3*x^2*e^2-b*ln
(x^n)/d^4*x*e^3+b*ln(x^n)*e^4/d^5*ln(d*x+e)-b*n*e^4/d^5*ln(d*x+e)*ln(-d*x/
e)-b*n*e^4/d^5*dilog(-d*x/e)-1/16*b*n*x^4/d+1/9*b*e*n*x^3/d^2-1/4*b*e^2*n*
x^2/d^3+b*e^3*n*x/d^4+205/144*b*n*e^4/d^5+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^
n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^
n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/d^4*(1/4*d^3*x
^4-1/3*e*d^2*x^3+1/2*d*e^2*x^2-x*e^3)+e^4/d^5*ln(d*x+e))
```

3.329.5 Fricas [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x^4*log(c*x^n) + a*x^4)/(d*x + e), x)
```

3.329.6 Sympy [A] (verification not implemented)

Time = 75.86 (sec) , antiderivative size = 316, normalized size of antiderivative = 1.71

$$\int \frac{x^3(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \frac{ax^4}{4d} - \frac{aex^3}{3d^2} + \frac{ae^2x^2}{2d^3} + \frac{ae^4\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d^4} - \frac{ae^3x}{d^4} - \frac{bnx^4}{16d} + \frac{bx^4\log(cx^n)}{4d} + \frac{benx^3}{9d^2} - \frac{bex^3\log(cx^n)}{3d^2} - \frac{be^2nx^2}{4d^3} + \frac{be^2x^2\log(cx^n)}{2d^3} - \frac{be^4n\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{d^4} + \frac{be^4\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^4} + \frac{be^3nx}{d^4} - \frac{be^3x\log(cx^n)}{d^4}$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(d+e/x),x)
```

output
```
a*x**4/(4*d) - a*e*x**3/(3*d**2) + a*e**2*x**2/(2*d**3) + a*e**4*Piecewise
((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d**4 - a*e**3*x/d**4 - b*n*x**4/
(16*d) + b*x**4*log(c*x**n)/(4*d) + b*e*n*x**3/(9*d**2) - b*e*x**3*log(c*x
**n)/(3*d**2) - b*e**2*n*x**2/(4*d**3) + b*e**2*x**2*log(c*x**n)/(2*d**3)
- b*e**4*n*Piecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_pola
r(I*pi)/e), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*
x*exp_polar(I*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_
polar(I*pi)/e), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*lo
g(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_
polar(I*pi)/e), True))/d, True))/d**4 + b*e**4*Piecewise((x/e, Eq(d, 0)),
(log(d*x + e)/d, True))*log(c*x**n)/d**4 + b*e**3*n*x/d**4 - b*e**3*x*log(
c*x**n)/d**4
```

3.329.7 Maxima [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e/x),x, algorithm="maxima")
```

output
```
1/12*a*(12*e^4*log(d*x + e)/d^5 + (3*d^3*x^4 - 4*d^2*e*x^3 + 6*d*e^2*x^2 -
 12*e^3*x)/d^4) + b*integrate((x^4*log(c) + x^4*log(x^n))/(d*x + e), x)
```

3.329.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(d + e/x), x)
```

3.329.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{d+\frac{e}{x}}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e/x),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e/x), x)
```

3.330 $\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$

3.330.1 Optimal result

Integrand size = 23, antiderivative size = 148

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \frac{ae^2x}{d^3}-\frac{be^2nx}{d^3}+\frac{benx^2}{4d^2}-\frac{bnx^3}{9d}+\frac{be^2x\log(cx^n)}{d^3} - \frac{ex^2(a+b\log(cx^n))}{2d^2}+\frac{x^3(a+b\log(cx^n))}{3d} - \frac{e^3(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d^4}-\frac{be^3n\,\mathrm{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^4}$$

output
```
a*e^2*x/d^3-b*e^2*n*x/d^3+1/4*b*e*n*x^2/d^2-1/9*b*n*x^3/d+b*e^2*x*ln(c*x^n
)/d^3-1/2*e*x^2*(a+b*ln(c*x^n))/d^2+1/3*x^3*(a+b*ln(c*x^n))/d-e^3*(a+b*ln(
c*x^n))*ln(1+d*x/e)/d^4-b*e^3*n*polylog(2,-d*x/e)/d^4
```

3.330.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 142, normalized size of antiderivative = 0.96

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \frac{36ade^2x-36bde^2nx-18ad^2ex^2+9bd^2enx^2+12ad^3x^3-4bd^3nx^3-36ae^3\log\left(1+\frac{dx}{e}\right)+6b\log(cx^n)\left(d\right.}{36d^4}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e/x),x]
```

output
```
(36*a*d*e^2*x - 36*b*d*e^2*n*x - 18*a*d^2*e*x^2 + 9*b*d^2*e*n*x^2 + 12*a*d
^3*x^3 - 4*b*d^3*n*x^3 - 36*a*e^3*Log[1 + (d*x)/e] + 6*b*Log[c*x^n]*(d*x*(
6*e^2 - 3*d*e*x + 2*d^2*x^2) - 6*e^3*Log[1 + (d*x)/e]) - 36*b*e^3*n*PolyLo
g[2, -((d*x)/e)])/(36*d^4)
```

3.330.3 Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2005, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{x^3(a+b\log(cx^n))}{dx+e}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(-\frac{e^3(a+b\log(cx^n))}{d^3(dx+e)}+\frac{e^2(a+b\log(cx^n))}{d^3}-\frac{ex(a+b\log(cx^n))}{d^2}+\frac{x^2(a+b\log(cx^n))}{d}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{e^3\log\left(\frac{dx}{e}+1\right)(a+b\log(cx^n))}{d^4}-\frac{ex^2(a+b\log(cx^n))}{2d^2}+\frac{x^3(a+b\log(cx^n))}{3d}+\frac{ae^2x}{d^3}+\frac{be^2x\log(cx^n)}{d^3}-\frac{be^3n\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^4}-\frac{be^2nx}{d^3}+\frac{benx^2}{4d^2}-\frac{bnx^3}{9d}$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e/x),x]
```

output
```
(a*e^2*x)/d^3 - (b*e^2*n*x)/d^3 + (b*e*n*x^2)/(4*d^2) - (b*n*x^3)/(9*d) +
(b*e^2*x*Log[c*x^n])/d^3 - (e*x^2*(a + b*Log[c*x^n]))/(2*d^2) + (x^3*(a +
b*Log[c*x^n]))/(3*d) - (e^3*(a + b*Log[c*x^n])*Log[1 + (d*x)/e])/d^4 - (b*
e^3*n*PolyLog[2, -((d*x)/e)])/d^4
```

3.330.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.330.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.18 (sec) , antiderivative size = 272, normalized size of antiderivative = 1.84

method	result
risch	$\frac{b\ln(x^n)x^3}{3d} - \frac{b\ln(x^n)e\,x^2}{2d^2} + \frac{b\ln(x^n)x\,e^2}{d^3} - \frac{b\ln(x^n)e^3\ln(dx+e)}{d^4} - \frac{bn\,x^3}{9d} + \frac{ben\,x^2}{4d^2} - \frac{b\,e^2nx}{d^3} - \frac{49bn\,e^3}{36d^4} + \frac{bn\,e^3\ln(dx+e)}{d^4}$

input
```
int(x^2*(a+b*ln(c*x^n))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
1/3*b*ln(x^n)/d*x^3-1/2*b*ln(x^n)/d^2*e*x^2+b*ln(x^n)/d^3*x*e^2-b*ln(x^n)*
e^3/d^4*ln(d*x+e)-1/9*b*n*x^3/d+1/4*b*e*n*x^2/d^2-b*e^2*n*x/d^3-49/36*b*n*
e^3/d^4+b*n*e^3/d^4*ln(d*x+e)*ln(-d*x/e)+b*n*e^3/d^4*dilog(-d*x/e)+(-1/2*I
*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^
n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*l
n(c)+a)*(1/d^3*(1/3*d^2*x^3-1/2*d*e*x^2+x*e^2)-e^3/d^4*ln(d*x+e))
```

3.330.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx=\int \frac{(b\log(cx^n)+a)x^2}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(d*x + e), x)
```

3.330.6 Sympy [A] (verification not implemented)

Time = 80.12 (sec) , antiderivative size = 267, normalized size of antiderivative = 1.80

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx=\frac{ax^3}{3d}-\frac{aex^2}{2d^2}-\frac{ae^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d^3}$$
$$+\frac{ae^2x}{d^3}-\frac{bnx^3}{9d}+\frac{bx^3\log(cx^n)}{3d}+\frac{benx^2}{4d^2}-\frac{bex^2\log(cx^n)}{2d^2}$$
$$+\frac{be^3n\left(\begin{cases}\frac{x}{e} & \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d} & \end{cases}\right)}{d^3}$$
$$-\frac{be^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^3}-\frac{be^2nx}{d^3}+\frac{be^2x\log(cx^n)}{d^3}$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(d+e/x),x)
```

output
```
a*x**3/(3*d) - a*e*x**2/(2*d**2) - a*e**3*Piecewise((x/e, Eq(d, 0)), (log(
d*x + e)/d, True))/d**3 + a*e**2*x/d**3 - b*n*x**3/(9*d) + b*x**3*log(c*x*
*n)/(3*d) + b*e*n*x**2/(4*d**2) - b*e*x**2*log(c*x**n)/(2*d**2) + b*e**3*n
*Piecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e)
, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_pola
r(I*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi
)/e), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + mei
jerg(((1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi
)/e), True))/d, True))/d**3 - b*e**3*Piecewise((x/e, Eq(d, 0)), (log(d*x +
 e)/d, True))*log(c*x**n)/d**3 - b*e**2*n*x/d**3 + b*e**2*x*log(c*x**n)/d*
*3
```

3.330.7 Maxima [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e/x),x, algorithm="maxima")
```

output
```
-1/6*a*(6*e^3*log(d*x + e)/d^4 - (2*d^2*x^3 - 3*d*e*x^2 + 6*e^2*x)/d^3) +
b*integrate((x^3*log(c) + x^3*log(x^n))/(d*x + e), x)
```

3.330.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(d + e/x), x)
```

3.330.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{d+\frac{e}{x}}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e/x),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e/x), x)
```

3.331 $\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx$

3.331.1 Optimal result

Integrand size = 21, antiderivative size = 107

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = -\frac{aex}{d^2}+\frac{benx}{d^2}-\frac{bnx^2}{4d}-\frac{bex\log(cx^n)}{d^2}+\frac{x^2(a+b\log(cx^n))}{2d} + \frac{e^2(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d^3}+\frac{be^2n\,\mathrm{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^3}$$

output
```
-a*e*x/d^2+b*e*n*x/d^2-1/4*b*n*x^2/d-b*e*x*ln(c*x^n)/d^2+1/2*x^2*(a+b*ln(c
*x^n))/d+e^2*(a+b*ln(c*x^n))*ln(1+d*x/e)/d^3+b*e^2*n*polylog(2,-d*x/e)/d^3
```

3.331.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 105, normalized size of antiderivative = 0.98

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \frac{-4adex+4bdenx+2ad^2x^2-bd^2nx^2+4ae^2\log\left(1+\frac{dx}{e}\right)+2b\log(cx^n)\left(dx(-2e+dx)+2e^2\log\left(1+\frac{dx}{e}\right.\right.}{4d^3}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e/x),x]
```

output
```
(-4*a*d*e*x + 4*b*d*e*n*x + 2*a*d^2*x^2 - b*d^2*n*x^2 + 4*a*e^2*Log[1 + (d
*x)/e] + 2*b*Log[c*x^n]*(d*x*(-2*e + d*x) + 2*e^2*Log[1 + (d*x)/e]) + 4*b*
e^2*n*PolyLog[2, -((d*x)/e)])/(4*d^3)
```

3.331.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 107, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {2005, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{x^2(a+b\log(cx^n))}{dx+e}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{e^2(a+b\log(cx^n))}{d^2(dx+e)}-\frac{e(a+b\log(cx^n))}{d^2}+\frac{x(a+b\log(cx^n))}{d}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^2\log\left(\frac{dx}{e}+1\right)(a+b\log(cx^n))}{d^3}+\frac{x^2(a+b\log(cx^n))}{2d}-\frac{aex}{d^2}-\frac{bex\log(cx^n)}{d^2}+\frac{be^2n\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^3}+\frac{benx}{d^2}-\frac{bnx^2}{4d}$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e/x),x]
```

output
```
-((a*e*x)/d^2) + (b*e*n*x)/d^2 - (b*n*x^2)/(4*d) - (b*e*x*Log[c*x^n])/d^2
+ (x^2*(a + b*Log[c*x^n]))/(2*d) + (e^2*(a + b*Log[c*x^n])*Log[1 + (d*x)/e
])/d^3 + (b*e^2*n*PolyLog[2, -((d*x)/e)])/d^3
```

3.331.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.331.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.13 (sec) , antiderivative size = 233, normalized size of antiderivative = 2.18

method	result
risch	$\frac{b\ln(x^n)x^2}{2d} - \frac{b\ln(x^n)ex}{d^2} + \frac{b\ln(x^n)e^2\ln(dx+e)}{d^3} - \frac{bn\,e^2\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{d^3} - \frac{bn\,e^2\,\mathrm{dilog}\left(-\frac{dx}{e}\right)}{d^3} - \frac{bn\,x^2}{4d} + \frac{benx}{d^2} + \frac{5bn\,e^2}{4d^3}$

input
```
int(x*(a+b*ln(c*x^n))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
1/2*b*ln(x^n)/d*x^2-b*ln(x^n)/d^2*e*x+b*ln(x^n)*e^2/d^3*ln(d*x+e)-b*n*e^2/
d^3*ln(d*x+e)*ln(-d*x/e)-b*n*e^2/d^3*dilog(-d*x/e)-1/4*b*n*x^2/d+b*e*n*x/d
^2+5/4*b*n*e^2/d^3+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*
b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*
I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(1/d^2*(1/2*d*x^2-e*x)+e^2/d^3*ln(d*x+e)
)
```

3.331.5 Fricas [F]

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx^n)+a)x}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(d*x + e), x)
```

3.331.6 Sympy [A] (verification not implemented)

Time = 53.55 (sec) , antiderivative size = 218, normalized size of antiderivative = 2.04

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \frac{ax^2}{2d} + \frac{ae^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d^2} - \frac{aex}{d^2} - \frac{bnx^2}{4d} + \frac{bx^2\log(cx^n)}{2d}$$

$$- \frac{be^2n\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1 \\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{d^2}$$

$$+ \frac{be^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2} + \frac{benx}{d^2} - \frac{bex\log(cx^n)}{d^2}$$

input
```
integrate(x*(a+b*ln(c*x**n))/(d+e/x),x)
```

output
```
a*x**2/(2*d) + a*e**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d
**2 - a*e*x/d**2 - b*n*x**2/(4*d) + b*x**2*log(c*x**n)/(2*d) - b*e**2*n*Pi
ecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (
Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I
*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e
), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijer
g(((1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e
), True))/d, True))/d**2 + b*e**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)
/d, True))*log(c*x**n)/d**2 + b*e*n*x/d**2 - b*e*x*log(c*x**n)/d**2
```

3.331.7 Maxima [F]

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx^n)+a)x}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e/x),x, algorithm="maxima")
```

output
```
1/2*a*(2*e^2*log(d*x + e)/d^3 + (d*x^2 - 2*e*x)/d^2) + b*integrate((x^2*lo
g(c) + x^2*log(x^n))/(d*x + e), x)
```

3.331.8 Giac [F]

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx^n)+a)x}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(d + e/x), x)
```

3.331.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx^n))}{d+\frac{e}{x}}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{d+\frac{e}{x}}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e/x),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e/x), x)
```

3.332 $\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx$

3.332.1 Optimal result

Integrand size = 20, antiderivative size = 69

$$\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx = \frac{ax}{d}-\frac{bnx}{d}+\frac{bx\log(cx^n)}{d}-\frac{e(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d^2}-\frac{ben\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}$$

output
```
a*x/d-b*n*x/d+b*x*ln(c*x^n)/d-e*(a+b*ln(c*x^n))*ln(1+d*x/e)/d^2-b*e*n*poly
log(2,-d*x/e)/d^2
```

3.332.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 66, normalized size of antiderivative = 0.96

$$\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx = \frac{adx-bdnx-ae\log\left(1+\frac{dx}{e}\right)+b\log(cx^n)\left(dx-e\log\left(1+\frac{dx}{e}\right)\right)-ben\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e/x),x]
```

output
```
(a*d*x - b*d*n*x - a*e*Log[1 + (d*x)/e] + b*Log[c*x^n]*(d*x - e*Log[1 + (d
*x)/e]) - b*e*n*PolyLog[2, -((d*x)/e)])/d^2
```

3.332.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}dx$$

$$\Big\downarrow \text{2767}$$

$$\int \left(\frac{a+b\log(cx^n)}{d}-\frac{e(a+b\log(cx^n))}{d(dx+e)}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$-\frac{e\log\left(\frac{dx}{e}+1\right)(a+b\log(cx^n))}{d^2}+\frac{ax}{d}+\frac{bx\log(cx^n)}{d}-\frac{ben\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}-\frac{bnx}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(d + e/x),x]
```

output
```
(a*x)/d - (b*n*x)/d + (b*x*Log[c*x^n])/d - (e*(a + b*Log[c*x^n])*Log[1 + (
d*x)/e])/d^2 - (b*e*n*PolyLog[2, -((d*x)/e)])/d^2
```

3.332.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

3.332.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.11 (sec) , antiderivative size = 188, normalized size of antiderivative = 2.72

method	result
risch	$\frac{b\ln(x^n)x}{d}-\frac{b\ln(x^n)e\ln(dx+e)}{d^2}-\frac{bnx}{d}-\frac{bne}{d^2}+\frac{bne\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{d^2}+\frac{bne\,\mathrm{dilog}\left(-\frac{dx}{e}\right)}{d^2}+\left(-\frac{ib\pi\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{cs}\right.$

input
```
int((a+b*ln(c*x^n))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)/d*x-b*ln(x^n)*e/d^2*ln(d*x+e)-b*n*x/d-b*n*e/d^2+b*n*e/d^2*ln(d*x
+e)*ln(-d*x/e)+b*n*e/d^2*dilog(-d*x/e)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*
csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*
csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(x/d-e/d^2*ln(d*x+e)
)
```

3.332.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx=\int \frac{b\log(cx^n)+a}{d+\frac{e}{x}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x^n) + a*x)/(d*x + e), x)
```

3.332.6 Sympy [A] (verification not implemented)

Time = 42.53 (sec) , antiderivative size = 163, normalized size of antiderivative = 2.36

$$\int \frac{a+b\log(cx^n)}{d+\frac{e}{x}}\,dx = -\frac{ae\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d} + \frac{ax}{d}$$
$$+\frac{ben\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\wedge |x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{d}$$
$$-\frac{be\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d} - \frac{bnx}{d} + \frac{bx\log(cx^n)}{d}$$

input
```
integrate((a+b*ln(c*x**n))/(d+e/x),x)
```

output
```
-a*e*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d + a*x/d + b*e*n*
Piecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e),
 (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar
(I*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)
/e), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meij
erg(((1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)
/e), True))/d, True))/d - b*e*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d,
True))*log(c*x**n)/d - b*n*x/d + b*x*log(c*x**n)/d
```

3.332.7 Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{d+\frac{e}{x}}\,dx=\int \frac{b\log\left(cx^n\right)+a}{d+\frac{e}{x}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x),x, algorithm="maxima")
```

output
```
a*(x/d - e*log(d*x + e)/d^2) + b*integrate((x*log(c) + x*log(x^n))/(d*x +
e), x)
```

3.332.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{d+\frac{e}{x}}\,dx=\int \frac{b\log\left(cx^n\right)+a}{d+\frac{e}{x}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(d + e/x), x)
```

3.332.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{d+\frac{e}{x}}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{d+\frac{e}{x}}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e/x),x)
```

output
```
int((a + b*log(c*x^n))/(d + e/x), x)
```

3.333 $\int \frac{a+b\log(cx^n)}{(d+\frac{e}{x})x}\,dx$

3.333.1 Optimal result

Integrand size = 23, antiderivative size = 39

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x}\,dx=\frac{(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{d}+\frac{bn\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}$$

output
```
(a+b*ln(c*x^n))*ln(1+d*x/e)/d+b*n*polylog(2,-d*x/e)/d
```

3.333.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 37, normalized size of antiderivative = 0.95

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x}\,dx=\frac{(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)+bn\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}$$

input
```
Integrate[(a + b*Log[c*x^n])/((d + e/x)*x),x]
```

output
```
((a + b*Log[c*x^n])*Log[1 + (d*x)/e] + b*n*PolyLog[2, -((d*x)/e)])/d
```

3.333.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 39, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2005, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x\left(d+\frac{e}{x}\right)}dx$$

$$\Big\downarrow \ 2005$$

$$\int \frac{a+b\log(cx^n)}{dx+e}dx$$

$$\Big\downarrow \ 2754$$

$$\frac{\log\left(\frac{dx}{e}+1\right)(a+b\log(cx^n))}{d}-\frac{bn\int \frac{\log\left(\frac{dx}{e}+1\right)}{x}dx}{d}$$

$$\Big\downarrow \ 2838$$

$$\frac{\log\left(\frac{dx}{e}+1\right)(a+b\log(cx^n))}{d}+\frac{bn\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/((d + e/x)*x),x]
```

output
```
((a + b*Log[c*x^n])*Log[1 + (d*x)/e])/d + (b*n*PolyLog[2, -((d*x)/e)])/d
```

3.333.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.333.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.08 (sec) , antiderivative size = 151, normalized size of antiderivative = 3.87

method	result
risch	$\frac{b\ln(x^n)\ln(dx+e)}{d} - \frac{bn\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{d} - \frac{bn\,\mathrm{dilog}\left(-\frac{dx}{e}\right)}{d} + \left(-\frac{ib\pi\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)}{2} + \frac{ib\pi\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2}{2} + \frac{i}{}\right.$

input
```
int((a+b*ln(c*x^n))/(d+e/x)/x,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)*ln(d*x+e)/d-b/d*n*ln(d*x+e)*ln(-d*x/e)-b/d*n*dilog(-d*x/e)+(-1/2
*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*
x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b
*ln(c)+a)*ln(d*x+e)/d
```

3.333.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x}\,dx = \int \frac{b\log\left(cx^n\right)+a}{\left(d+\frac{e}{x}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(d*x + e), x)
```

3.333.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x}\,dx=\int \frac{a+b\log(cx^n)}{dx+e}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(d+e/x)/x,x)
```

output
```
Integral((a + b*log(c*x**n))/(d*x + e), x)
```

3.333.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x}\,dx=\int \frac{b\log(cx^n)+a}{\left(d+\frac{e}{x}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x,x, algorithm="maxima")
```

output
```
b*integrate((log(c) + log(x^n))/(d*x + e), x) + a*log(d*x + e)/d
```

3.333.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x}\,dx=\int \frac{b\log(cx^n)+a}{\left(d+\frac{e}{x}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((d + e/x)*x), x)
```

3.333.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x}\,dx = \int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e/x)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e/x)), x)
```

3.334 $\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^2}\,dx$

3.334.1 Optimal result

Integrand size = 23, antiderivative size = 44

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^2}\,dx=-\frac{\log\left(1+\frac{e}{dx}\right)(a+b\log(cx^n))}{e}+\frac{bn\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}$$

output
```
-ln(1+e/d/x)*(a+b*ln(c*x^n))/e+b*n*polylog(2,-e/d/x)/e
```

3.334.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.43

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^2}\,dx=\frac{(a+b\log(cx^n))\left(a+b\log(cx^n)-2bn\log\left(1+\frac{dx}{e}\right)\right)}{2ben}-\frac{bn\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{e}$$

input
```
Integrate[(a + b*Log[c*x^n])/((d + e/x)*x^2),x]
```

output
```
((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1 + (d*x)/e]))/(2*b*e*n)
 - (b*n*PolyLog[2, -((d*x)/e)])/e
```

3.334.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2005, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2\left(d+\frac{e}{x}\right)}dx$$
$$\Big\downarrow \text{ 2005}$$
$$\int \frac{a+b\log(cx^n)}{x(dx+e)}dx$$
$$\Big\downarrow \text{ 2779}$$
$$\frac{bn\int \frac{\log\left(\frac{e}{dx}+1\right)}{x}dx}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx^n))}{e}$$
$$\Big\downarrow \text{ 2838}$$
$$\frac{bn\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx^n))}{e}$$

input
```
Int[(a + b*Log[c*x^n])/((d + e/x)*x^2),x]
```

output
```
-((Log[1 + e/(d*x)]*(a + b*Log[c*x^n]))/e) + (b*n*PolyLog[2, -(e/(d*x))])/
e
```

3.334.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.334.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.10 (sec) , antiderivative size = 181, normalized size of antiderivative = 4.11

method	result
risch	$-\frac{b\ln(x^n)\ln(dx+e)}{e}+\frac{b\ln(x^n)\ln(x)}{e}-\frac{bn\ln(x)^2}{2e}+\frac{bn\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{e}+\frac{bn\,\mathrm{dilog}\left(-\frac{dx}{e}\right)}{e}+\left(-\frac{ib\pi\ \mathrm{csgn}(ic)\ \mathrm{csgn}(ix^n)\ \mathrm{c}}{2}\right.$

input
```
int((a+b*ln(c*x^n))/(d+e/x)/x^2,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)/e*ln(d*x+e)+b*ln(x^n)/e*ln(x)-1/2*b*n/e*ln(x)^2+b*n/e*ln(d*x+e)
*ln(-d*x/e)+b*n/e*dilog(-d*x/e)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*
c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*
c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-1/e*ln(d*x+e)+1/e*ln(x))
```

3.334.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^2}\,dx=\int \frac{b\log(cx^n)+a}{\left(d+\frac{e}{x}\right)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(d*x^2 + e*x), x)
```

3.334.6 Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 6.04 (sec) , antiderivative size = 173, normalized size of antiderivative = 3.93

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \frac{2ad\left(\begin{cases} -\frac{x}{e}-\frac{1}{2d} & \text{for } d=0 \\ \frac{\log(2dx)}{2d} & \text{otherwise} \end{cases}\right)}{e} - \frac{2ad\left(\begin{cases} \frac{x}{e}+\frac{1}{2d} & \text{for } d=0 \\ \frac{\log(2dx+2e)}{2d} & \text{otherwise} \end{cases}\right)}{e} + bn\left(\begin{cases} -\frac{1}{dx} \\ \frac{\begin{cases} \operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ \log(d)\log(x)+\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for } |x|<1 \\ -\log(d)\log\left(\frac{1}{x}\right)+\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for } \frac{1}{|x|}<1 \\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)\log(d)+\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{otherwise} \end{cases}}{e} \end{cases}\right) - b\left(\begin{cases} \frac{1}{dx} & \text{for } e=0 \\ \frac{\log\left(d+\frac{e}{x}\right)}{e} & \text{otherwise} \end{cases}\right)\log(cx^n)$$

input
```
integrate((a+b*ln(c*x**n))/(d+e/x)/x**2,x)
```

output
```
2*a*d*Piecewise((-x/e - 1/(2*d), Eq(d, 0)), (log(2*d*x)/(2*d), True))/e -
2*a*d*Piecewise((x/e + 1/(2*d), Eq(d, 0)), (log(2*d*x + 2*e)/(2*d), True))
/e + b*n*Piecewise((-1/(d*x), Eq(e, 0)), (Piecewise((polylog(2, e*exp_pola
r(I*pi)/(d*x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) + polylog(2
, e*exp_polar(I*pi)/(d*x)), Abs(x) < 1), (-log(d)*log(1/x) + polylog(2, e*
exp_polar(I*pi)/(d*x)), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()
), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) + polylog(2,
e*exp_polar(I*pi)/(d*x)), True))/e, True)) - b*Piecewise((1/(d*x), Eq(e, 0
)), (log(d + e/x)/e, True))*log(c*x**n)
```

3.334.7 Maxima [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(d+\frac{e}{x}\right)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^2,x, algorithm="maxima")
```

output
```
-a*(log(d*x + e)/e - log(x)/e) + b*integrate((log(c) + log(x^n))/(d*x^2 +
e*x), x)
```

3.334.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(d+\frac{e}{x}\right)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((d + e/x)*x^2), x)
```

3.334.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x^2}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^2\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e/x)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e/x)), x)
```

3.335 $\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx$

3.335.1 Optimal result

Integrand size = 23, antiderivative size = 95

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx=-\frac{bn}{ex}-\frac{a+b\log(cx^n)}{ex}-\frac{d(a+b\log(cx^n))^2}{2be^2n}+\frac{d(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{e^2}+\frac{bdn\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{e^2}$$

output
```
-b*n/e/x+(-a-b*ln(c*x^n))/e/x-1/2*d*(a+b*ln(c*x^n))^2/b/e^2/n+d*(a+b*ln(c*
x^n))*ln(1+d*x/e)/e^2+b*d*n*polylog(2,-d*x/e)/e^2
```

3.335.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 88, normalized size of antiderivative = 0.93

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx=-\frac{\frac{2ben}{x}+\frac{2e(a+b\log(cx^n))}{x}+\frac{d(a+b\log(cx^n))^2}{bn}-2d(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)-2bdn\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{2e^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/((d + e/x)*x^3),x]
```

output
```
-1/2*((2*b*e*n)/x + (2*e*(a + b*Log[c*x^n]))/x + (d*(a + b*Log[c*x^n])^2)/
(b*n) - 2*d*(a + b*Log[c*x^n])*Log[1 + (d*x)/e] - 2*b*d*n*PolyLog[2, -((d*
x)/e)])/e^2
```

3.335.3 Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 78, normalized size of antiderivative = 0.82, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.217, Rules used = {2005, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3\left(d+\frac{e}{x}\right)}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{a+b\log(cx^n)}{x^2(dx+e)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^2}dx}{e}-\frac{d\int \frac{a+b\log(cx^n)}{x(e+dx)}dx}{e}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{e}-\frac{d\int \frac{a+b\log(cx^n)}{x(e+dx)}dx}{e}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{e}-\frac{d\left(\frac{bn\int \frac{\log\left(\frac{e}{dx}+1\right)}{x}dx}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx^n))}{e}\right)}{e}$$

$$\Big\downarrow \text{2838}$$

$$\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{e}-\frac{d\left(\frac{bn\operatorname{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx^n))}{e}\right)}{e}$$

input
```
Int[(a + b*Log[c*x^n])/((d + e/x)*x^3),x]
```

output
```
(-((b*n)/x) - (a + b*Log[c*x^n])/x)/e - (d*(-((Log[1 + e/(d*x)]*(a + b*Log
[c*x^n]))/e) + (b*n*PolyLog[2, -(e/(d*x))])/e))/e
```

3.335.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.335.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.13 (sec) , antiderivative size = 221, normalized size of antiderivative = 2.33

method	result
risch	$\frac{b\ln(x^n)d\ln(dx+e)}{e^2} - \frac{b\ln(x^n)}{ex} - \frac{b\ln(x^n)d\ln(x)}{e^2} - \frac{bnd\ln(dx+e)\ln\left(-\frac{dx}{e}\right)}{e^2} - \frac{bnd\,\mathrm{dilog}\left(-\frac{dx}{e}\right)}{e^2} - \frac{bn}{ex} + \frac{bnd\ln(x)^2}{2e^2} + \Big(-$

input
```
int((a+b*ln(c*x^n))/(d+e/x)/x^3,x,method=_RETURNVERBOSE)
```

output
```
b*ln(x^n)*d/e^2*ln(d*x+e)-b*ln(x^n)/e/x-b*ln(x^n)*d/e^2*ln(x)-b*n*d/e^2*ln
(d*x+e)*ln(-d*x/e)-b*n*d/e^2*dilog(-d*x/e)-b*n/e/x+1/2*b*n*d/e^2*ln(x)^2+(
-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(
I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)
^3+b*ln(c)+a)*(d/e^2*ln(d*x+e)-1/e/x-d/e^2*ln(x))
```

3.335.5 Fricas [F]

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+\frac{e}{x}\right)x^3}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(d+\frac{e}{x}\right)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(d*x^3 + e*x^2), x)
```

3.335.6 Sympy [A] (verification not implemented)

Time = 37.15 (sec) , antiderivative size = 216, normalized size of antiderivative = 2.27

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \frac{ad^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{e^2} - \frac{ad\log(x)}{e^2} - \frac{a}{ex} - \frac{bd^2n\left(\begin{cases}\frac{x}{e} & \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d} & \end{cases}\right)}{e^2} + \frac{bd^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^2} + \frac{bdn\log(x)^2}{2e^2} - \frac{bd\log(x)\log(cx^n)}{e^2} - \frac{bn}{ex} - \frac{b\log(cx^n)}{ex}$$

input
```
integrate((a+b*ln(c*x**n))/(d+e/x)/x**3,x)
```

output
```
a*d**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/e**2 - a*d*log(x
)/e**2 - a/(e*x) - b*d**2*n*Piecewise((x/e, Eq(d, 0)), (Piecewise((-polylo
g(2, d*x*exp_polar(I*pi)/e), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x
) - polylog(2, d*x*exp_polar(I*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - po
lylog(2, d*x*exp_polar(I*pi)/e), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((
0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) - po
lylog(2, d*x*exp_polar(I*pi)/e), True))/d, True))/e**2 + b*d**2*Piecewise(
(x/e, Eq(d, 0)), (log(d*x + e)/d, True))*log(c*x**n)/e**2 + b*d*n*log(x)**
2/(2*e**2) - b*d*log(x)*log(c*x**n)/e**2 - b*n/(e*x) - b*log(c*x**n)/(e*x)
```

3.335.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \int \frac{b\log(cx^n)+a}{\left(d+\frac{e}{x}\right)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^3,x, algorithm="maxima")
```

output
```
a*(d*log(d*x + e)/e^2 - d*log(x)/e^2 - 1/(e*x)) + b*integrate((log(c) + lo
g(x^n))/(d*x^3 + e*x^2), x)
```

3.335.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \int \frac{b\log(cx^n)+a}{\left(d+\frac{e}{x}\right)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((d + e/x)*x^3), x)
```

3.335.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^3\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e/x)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e/x)), x)
```

3.336 $\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^4}\,dx$

3.336.1 Optimal result

Integrand size = 23, antiderivative size = 135

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^4}\,dx=-\frac{bn}{4ex^2}+\frac{bdn}{e^2x}-\frac{a+b\log(cx^n)}{2ex^2}+\frac{d(a+b\log(cx^n))}{e^2x}+\frac{d^2(a+b\log(cx^n))^2}{2be^3n}-\frac{d^2(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)}{e^3}-\frac{bd^2n\,\mathrm{PolyLog}\left(2,-\frac{dx}{e}\right)}{e^3}$$

output
```
-1/4*b*n/e/x^2+b*d*n/e^2/x+1/2*(-a-b*ln(c*x^n))/e/x^2+d*(a+b*ln(c*x^n))/e^
2/x+1/2*d^2*(a+b*ln(c*x^n))^2/b/e^3/n-d^2*(a+b*ln(c*x^n))*ln(1+d*x/e)/e^3-
b*d^2*n*polylog(2,-d*x/e)/e^3
```

3.336.2 Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 124, normalized size of antiderivative = 0.92

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^4}\,dx=-\frac{\frac{be^2n}{x^2}-\frac{4bden}{x}+\frac{2e^2(a+b\log(cx^n))}{x^2}-\frac{4de(a+b\log(cx^n))}{x}-\frac{2d^2(a+b\log(cx^n))^2}{bn}+4d^2(a+b\log(cx^n))\log\left(1+\frac{dx}{e}\right)+4b}{4e^3}$$

input
```
Integrate[(a + b*Log[c*x^n])/((d + e/x)*x^4),x]
```

output
```
-1/4*((b*e^2*n)/x^2 - (4*b*d*e*n)/x + (2*e^2*(a + b*Log[c*x^n]))/x^2 - (4*
d*e*(a + b*Log[c*x^n]))/x - (2*d^2*(a + b*Log[c*x^n])^2)/(b*n) + 4*d^2*(a
+ b*Log[c*x^n])*Log[1 + (d*x)/e] + 4*b*d^2*n*PolyLog[2, -((d*x)/e)])/e^3
```

3.336.3 Rubi [A] (verified)

Time = 0.60 (sec) , antiderivative size = 116, normalized size of antiderivative = 0.86, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.304, Rules used = {2005, 2780, 2741, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^4\left(d+\frac{e}{x}\right)}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{a+b\log(cx^n)}{x^3(dx+e)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x^3}dx}{e}-\frac{d\int \frac{a+b\log(cx^n)}{x^2(e+dx)}dx}{e}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{e}-\frac{d\int \frac{a+b\log(cx^n)}{x^2(e+dx)}dx}{e}$$

$$\Big\downarrow \text{2780}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{e}-\frac{d\left(\frac{\int \frac{a+b\log(cx^n)}{x^2}dx}{e}-\frac{d\int \frac{a+b\log(cx^n)}{x(e+dx)}dx}{e}\right)}{e}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{e}-\frac{d\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{e}-\frac{d\int \frac{a+b\log(cx^n)}{x(e+dx)}dx}{e}\right)}{e}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{e}-\frac{d\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{e}-\frac{d\left(\frac{bn\int\frac{\log\left(\frac{e}{dx}+1\right)}{x}dx}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx^n))}{e}\right)}{e}\right)}{e}$$

$$\Big\downarrow \text{ 2838}$$

$$\frac{-\frac{a+b\log(cx^n)}{2x^2}-\frac{bn}{4x^2}}{e}-\frac{d\left(\frac{-\frac{a+b\log(cx^n)}{x}-\frac{bn}{x}}{e}-\frac{d\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx^n))}{e}\right)}{e}\right)}{e}$$

input
```
Int[(a + b*Log[c*x^n])/((d + e/x)*x^4),x]
```

output
```
(-1/4*(b*n)/x^2 - (a + b*Log[c*x^n])/(2*x^2))/e - (d*((-((b*n)/x) - (a + b
*Log[c*x^n])/x)/e - (d*(-((Log[1 + e/(d*x)]*(a + b*Log[c*x^n]))/e) + (b*n*
PolyLog[2, -(e/(d*x))])/e))/e))/e
```

3.336.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

3.336. $\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^4}\,dx$

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.336.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.18 (sec) , antiderivative size = 264, normalized size of antiderivative = 1.96

method	result
risch	$-\frac{b\ln(x^n)d^2\ln(dx+e)}{e^3}-\frac{b\ln(x^n)}{2e\,x^2}+\frac{b\ln(x^n)d^2\ln(x)}{e^3}+\frac{b\ln(x^n)d}{e^2x}+\frac{bdn}{e^2x}-\frac{bn}{4e\,x^2}-\frac{bn\,d^2\ln(x)^2}{2e^3}+\frac{bn\,d^2\ln(dx+e)\ln\left(-\frac{dx}{e}\right.}{e^3}$

input
```
int((a+b*ln(c*x^n))/(d+e/x)/x^4,x,method=_RETURNVERBOSE)
```

output
```
-b*ln(x^n)*d^2/e^3*ln(d*x+e)-1/2*b*ln(x^n)/e/x^2+b*ln(x^n)*d^2/e^3*ln(x)+b
*ln(x^n)*d/e^2/x+b*d*n/e^2/x-1/4*b*n/e/x^2-1/2*b*n*d^2/e^3*ln(x)^2+b*n*d^2
/e^3*ln(d*x+e)*ln(-d*x/e)+b*n*d^2/e^3*dilog(-d*x/e)+(-1/2*I*b*Pi*csgn(I*c)
*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi
*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-d^2/e
^3*ln(d*x+e)-1/2/e/x^2+d^2/e^3*ln(x)+d/e^2/x)
```

3.336.5 Fricas [F]

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^4}\,dx=\int \frac{b\log(cx^n)+a}{\left(d+\frac{e}{x}\right)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^4,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(d*x^4 + e*x^3), x)
```

3.336.6 Sympy [A] (verification not implemented)

Time = 42.97 (sec) , antiderivative size = 265, normalized size of antiderivative = 1.96

$$\int \frac{a+b\log(cx^n)}{\left(d+\frac{e}{x}\right)x^4}\,dx = -\frac{ad^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{e^3}+\frac{ad^2\log(x)}{e^3}+\frac{ad}{e^2x}-\frac{a}{2ex^2}$$
$$+\frac{bd^3n\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{e^3}$$
$$-\frac{bd^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx^n)}{e^3}-\frac{bd^2n\log(x)^2}{2e^3}$$
$$+\frac{bd^2\log(x)\log(cx^n)}{e^3}+\frac{bdn}{e^2x}+\frac{bd\log(cx^n)}{e^2x}-\frac{bn}{4ex^2}-\frac{b\log(cx^n)}{2ex^2}$$

input
```
integrate((a+b*ln(c*x**n))/(d+e/x)/x**4,x)
```

output
```
-a*d**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/e**3 + a*d**2*l
og(x)/e**3 + a*d/(e**2*x) - a/(2*e*x**2) + b*d**3*n*Piecewise((x/e, Eq(d,
0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs(x) < 1) & (1/Abs
(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)/e), Abs(x) < 1)
, (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1/Abs(x) < 1), (-
meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((),
 (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), True))/d, True))/
e**3 - b*d**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))*log(c*x**
n)/e**3 - b*d**2*n*log(x)**2/(2*e**3) + b*d**2*log(x)*log(c*x**n)/e**3 + b
*d*n/(e**2*x) + b*d*log(c*x**n)/(e**2*x) - b*n/(4*e*x**2) - b*log(c*x**n)/
(2*e*x**2)
```

3.336.7 Maxima [F]

$$\int \frac{a + b\log\left(cx^n\right)}{\left(d + \frac{e}{x}\right)x^4}\,dx = \int \frac{b\log\left(cx^n\right) + a}{\left(d + \frac{e}{x}\right)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^4,x, algorithm="maxima")
```

output
```
-1/2*a*(2*d^2*log(d*x + e)/e^3 - 2*d^2*log(x)/e^3 - (2*d*x - e)/(e^2*x^2))
 + b*integrate((log(c) + log(x^n))/(d*x^4 + e*x^3), x)
```

3.336.8 Giac [F]

$$\int \frac{a + b\log\left(cx^n\right)}{\left(d + \frac{e}{x}\right)x^4}\,dx = \int \frac{b\log\left(cx^n\right) + a}{\left(d + \frac{e}{x}\right)x^4}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e/x)/x^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((d + e/x)*x^4), x)
```

3.336.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log\left(cx^n\right)}{\left(d + \frac{e}{x}\right)x^4}\,dx = \int \frac{a + b\,\ln\left(c\,x^n\right)}{x^4\,\left(d + \frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^4*(d + e/x)),x)
```

output
```
int((a + b*log(c*x^n))/(x^4*(d + e/x)), x)
```

3.337 $\int \frac{x^3(a+b\log(cx))}{d+\frac{e}{x}}\,dx$

3.337.1 Optimal result

Integrand size = 21, antiderivative size = 170

$$\int \frac{x^3(a+b\log(cx))}{d+\frac{e}{x}}\,dx = -\frac{ae^3x}{d^4}+\frac{be^3x}{d^4}-\frac{be^2x^2}{4d^3}+\frac{bex^3}{9d^2}-\frac{bx^4}{16d}-\frac{be^3x\log(cx)}{d^4}+\frac{e^2x^2(a+b\log(cx))}{2d^3}-\frac{ex^3(a+b\log(cx))}{3d^2}+\frac{x^4(a+b\log(cx))}{4d}+\frac{e^4(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d^5}+\frac{be^4\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^5}$$

output
```
-a*e^3*x/d^4+b*e^3*x/d^4-1/4*b*e^2*x^2/d^3+1/9*b*e*x^3/d^2-1/16*b*x^4/d-b*
e^3*x*ln(c*x)/d^4+1/2*e^2*x^2*(a+b*ln(c*x))/d^3-1/3*e*x^3*(a+b*ln(c*x))/d^
2+1/4*x^4*(a+b*ln(c*x))/d+e^4*(a+b*ln(c*x))*ln(1+d*x/e)/d^5+b*e^4*polylog(
2,-d*x/e)/d^5
```

3.337.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 156, normalized size of antiderivative = 0.92

$$\int \frac{x^3(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \frac{-144ade^3x+144bde^3x-36bd^2e^2x^2+16bd^3ex^3-9bd^4x^4-144bde^3x\log(cx)+72d^2e^2x^2(a+b\log(cx))\cdots}{}$$

input
```
Integrate[(x^3*(a + b*Log[c*x]))/(d + e/x),x]
```

output
```
(-144*a*d*e^3*x + 144*b*d*e^3*x - 36*b*d^2*e^2*x^2 + 16*b*d^3*e*x^3 - 9*b*
d^4*x^4 - 144*b*d*e^3*x*Log[c*x] + 72*d^2*e^2*x^2*(a + b*Log[c*x]) - 48*d^
3*e*x^3*(a + b*Log[c*x]) + 36*d^4*x^4*(a + b*Log[c*x]) + 144*e^4*(a + b*Lo
g[c*x])*Log[1 + (d*x)/e] + 144*b*e^4*PolyLog[2, -((d*x)/e)])/(144*d^5)
```

3.337.3 Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 170, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2005, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx))}{d+\frac{e}{x}}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{x^4(a+b\log(cx))}{dx+e}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{e^4(a+b\log(cx))}{d^4(dx+e)}-\frac{e^3(a+b\log(cx))}{d^4}+\frac{e^2x(a+b\log(cx))}{d^3}-\frac{ex^2(a+b\log(cx))}{d^2}+\frac{x^3(a+b\log(cx))}{d}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^4\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d^5}+\frac{e^2x^2(a+b\log(cx))}{2d^3}-\frac{ex^3(a+b\log(cx))}{3d^2}+\frac{x^4(a+b\log(cx))}{4d}-\frac{ae^3x}{d^4}-\frac{be^3x\log(cx)}{d^4}+\frac{be^4\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^5}+\frac{be^3x}{d^4}-\frac{be^2x^2}{4d^3}+\frac{bex^3}{9d^2}-\frac{bx^4}{16d}$$

input
```
Int[(x^3*(a + b*Log[c*x]))/(d + e/x),x]
```

output
```
-((a*e^3*x)/d^4) + (b*e^3*x)/d^4 - (b*e^2*x^2)/(4*d^3) + (b*e*x^3)/(9*d^2)
 - (b*x^4)/(16*d) - (b*e^3*x*Log[c*x])/d^4 + (e^2*x^2*(a + b*Log[c*x]))/(2
*d^3) - (e*x^3*(a + b*Log[c*x]))/(3*d^2) + (x^4*(a + b*Log[c*x]))/(4*d) +
(e^4*(a + b*Log[c*x])*Log[1 + (d*x)/e])/d^5 + (b*e^4*PolyLog[2, -((d*x)/e)
])/d^5
```

3.337.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.337.4 Maple [A] (verified)

Time = 0.13 (sec) , antiderivative size = 204, normalized size of antiderivative = 1.20

method	result
parts	$a\left(\frac{\frac{1}{4}d^3x^4-\frac{1}{3}e\,d^2x^3+\frac{1}{2}d\,e^2x^2-x\,e^3}{d^4}+\frac{e^4\ln(dx+e)}{d^5}\right)+\frac{b\,x^4\ln(xc)}{4d}-\frac{b\,x^4}{16d}-\frac{be\,x^3\ln(xc)}{3d^2}+\frac{be\,x^3}{9d^2}+\frac{b\,e^2x^2\ln(x}{2d^3}$
risch	$\frac{a\,x^4}{4d}-\frac{ae\,x^3}{3d^2}+\frac{a\,e^2x^2}{2d^3}-\frac{a\,e^3x}{d^4}+\frac{a\,e^4\ln(dx+e)}{d^5}+\frac{b\,x^4\ln(xc)}{4d}-\frac{b\,x^4}{16d}-\frac{be\,x^3\ln(xc)}{3d^2}+\frac{be\,x^3}{9d^2}+\frac{b\,e^2x^2\ln(xc}{2d^3}$
derivativedivides	$\frac{a\left(-\frac{c^4e^3x-\frac{1}{2}d\,c^4e^2x^2+\frac{1}{3}e\,c^4x^3d^2-\frac{1}{4}x^4c^4d^3}{d^4}+\frac{c^4e^4\ln(cdx+ce)}{d^5}\right)+b\left(\frac{\frac{x^4c^4\ln(xc)}{4}-\frac{x^4c^4}{16}}{d}-\frac{ce\left(\frac{x^3c^3\ln(xc)}{3}-\frac{x^3c^3}{9}\right)}{d^2}+\frac{c^2e^2\left(x\right.}{}\right.}{c^4}$
default	$\frac{a\left(-\frac{c^4e^3x-\frac{1}{2}d\,c^4e^2x^2+\frac{1}{3}e\,c^4x^3d^2-\frac{1}{4}x^4c^4d^3}{d^4}+\frac{c^4e^4\ln(cdx+ce)}{d^5}\right)+b\left(\frac{\frac{x^4c^4\ln(xc)}{4}-\frac{x^4c^4}{16}}{d}-\frac{ce\left(\frac{x^3c^3\ln(xc)}{3}-\frac{x^3c^3}{9}\right)}{d^2}+\frac{c^2e^2\left(x\right.}{}\right.}{c^4}$

input
```
int(x^3*(a+b*ln(x*c))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
a*(1/d^4*(1/4*d^3*x^4-1/3*e*d^2*x^3+1/2*d*e^2*x^2-x*e^3)+e^4/d^5*ln(d*x+e)
)+1/4*b/d*x^4*ln(x*c)-1/16*b*x^4/d-1/3*b/d^2*e*x^3*ln(x*c)+1/9*b*e*x^3/d^2
+1/2*b/d^3*e^2*x^2*ln(x*c)-1/4*b*e^2*x^2/d^3-b*e^3*x*ln(x*c)/d^4+b*e^3*x/d
^4+b*e^4/d^5*dilog((c*d*x+c*e)/e/c)+b*e^4/d^5*ln(x*c)*ln((c*d*x+c*e)/e/c)
```

3.337.5 Fricas [F]

$$\int \frac{x^3(a+b\log(cx))}{d+\frac{e}{x}}\,dx=\int \frac{(b\log(cx)+a)x^3}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x^4*log(c*x) + a*x^4)/(d*x + e), x)
```

3.337.6 Sympy [A] (verification not implemented)

Time = 82.83 (sec) , antiderivative size = 299, normalized size of antiderivative = 1.76

$$\int \frac{x^3(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \frac{ax^4}{4d} - \frac{aex^3}{3d^2} + \frac{ae^2x^2}{2d^3} + \frac{ae^4\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d^4} - \frac{ae^3x}{d^4} + \frac{bx^4\log(cx)}{4d} - \frac{bx^4}{16d} - \frac{bex^3\log(cx)}{3d^2} + \frac{bex^3}{9d^2} + \frac{be^2x^2\log(cx)}{2d^3} - \frac{be^2x^2}{4d^3}$$
$$- \frac{be^4\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{d^4}$$
$$+ \frac{be^4\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx)}{d^4} - \frac{be^3x\log(cx)}{d^4} + \frac{be^3x}{d^4}$$

input
```
integrate(x**3*(a+b*ln(c*x))/(d+e/x),x)
```

output
```
a*x**4/(4*d) - a*e*x**3/(3*d**2) + a*e**2*x**2/(2*d**3) + a*e**4*Piecewise
((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d**4 - a*e**3*x/d**4 + b*x**4*lo
g(c*x)/(4*d) - b*x**4/(16*d) - b*e*x**3*log(c*x)/(3*d**2) + b*e*x**3/(9*d*
*2) + b*e**2*x**2*log(c*x)/(2*d**3) - b*e**2*x**2/(4*d**3) - b*e**4*Piecew
ise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs(
x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)
/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1
/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((
1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), T
rue))/d, True))/d**4 + b*e**4*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d,
True))*log(c*x)/d**4 - b*e**3*x*log(c*x)/d**4 + b*e**3*x/d**4
```

3.337.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 210, normalized size of antiderivative = 1.24

$$\int \frac{x^3(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \frac{\left(\log\left(\frac{dx}{e}+1\right)\log(x)+\mathrm{Li}_2\left(-\frac{dx}{e}\right)\right)be^4}{d^5} + \frac{9\left(4\,ad^3+\left(4\,d^3\log(c)-d^3\right)b\right)x^4-16\left(3\,ad^2e+\left(3\,d^2e\log(c)-d^2e\right)b\right)x^3+36\left(2\,ade^2+\left(2\,de^2\log(c)-\right.\right.}{144\,d^4} + \frac{\left(be^4\log(c)+ae^4\right)\log(dx+e)}{d^5}$$

input
```
integrate(x^3*(a+b*log(c*x))/(d+e/x),x, algorithm="maxima")
```

output
```
(log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b*e^4/d^5 + 1/144*(9*(4*a*d^3 + (4
*d^3*log(c) - d^3)*b)*x^4 - 16*(3*a*d^2*e + (3*d^2*e*log(c) - d^2*e)*b)*x^
3 + 36*(2*a*d*e^2 + (2*d*e^2*log(c) - d*e^2)*b)*x^2 - 144*(a*e^3 + (e^3*lo
g(c) - e^3)*b)*x + 12*(3*b*d^3*x^4 - 4*b*d^2*e*x^3 + 6*b*d*e^2*x^2 - 12*b*
e^3*x)*log(x))/d^4 + (b*e^4*log(c) + a*e^4)*log(d*x + e)/d^5
```

3.337.8 Giac [F]

$$\int \frac{x^3(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx)+a)x^3}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)*x^3/(d + e/x), x)
```

3.337.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^3(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x))}{d+\frac{e}{x}}\,dx$$

input
```
int((x^3*(a + b*log(c*x)))/(d + e/x),x)
```

output
```
int((x^3*(a + b*log(c*x)))/(d + e/x), x)
```

3.338 $\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx$

3.338.1 Optimal result

Integrand size = 21, antiderivative size = 136

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \frac{ae^2x}{d^3}-\frac{be^2x}{d^3}+\frac{bex^2}{4d^2}-\frac{bx^3}{9d}+\frac{be^2x\log(cx)}{d^3} - \frac{ex^2(a+b\log(cx))}{2d^2}+\frac{x^3(a+b\log(cx))}{3d} - \frac{e^3(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d^4}-\frac{be^3\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^4}$$

output
```
a*e^2*x/d^3-b*e^2*x/d^3+1/4*b*e*x^2/d^2-1/9*b*x^3/d+b*e^2*x*ln(c*x)/d^3-1/
2*e*x^2*(a+b*ln(c*x))/d^2+1/3*x^3*(a+b*ln(c*x))/d-e^3*(a+b*ln(c*x))*ln(1+d
*x/e)/d^4-b*e^3*polylog(2,-d*x/e)/d^4
```

3.338.2 Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.92

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \frac{36ade^2x-36bde^2x+9bd^2ex^2-4bd^3x^3+36bde^2x\log(cx)-18d^2ex^2(a+b\log(cx))+12d^3x^3(a+b\log(c}{36d^4}$$

input
```
Integrate[(x^2*(a + b*Log[c*x]))/(d + e/x),x]
```

output
```
(36*a*d*e^2*x - 36*b*d*e^2*x + 9*b*d^2*e*x^2 - 4*b*d^3*x^3 + 36*b*d*e^2*x*
Log[c*x] - 18*d^2*e*x^2*(a + b*Log[c*x]) + 12*d^3*x^3*(a + b*Log[c*x]) - 3
6*e^3*(a + b*Log[c*x])*Log[1 + (d*x)/e] - 36*b*e^3*PolyLog[2, -((d*x)/e)])
/(36*d^4)
```

3.338.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 136, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2005, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx$$

$$\Big\downarrow \text{ 2005}$$

$$\int \frac{x^3(a+b\log(cx))}{dx+e}dx$$

$$\Big\downarrow \text{ 2793}$$

$$\int \left(-\frac{e^3(a+b\log(cx))}{d^3(dx+e)}+\frac{e^2(a+b\log(cx))}{d^3}-\frac{ex(a+b\log(cx))}{d^2}+\frac{x^2(a+b\log(cx))}{d}\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{e^3\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d^4}-\frac{ex^2(a+b\log(cx))}{2d^2}+\frac{x^3(a+b\log(cx))}{3d}+\frac{ae^2x}{d^3}+\frac{be^2x\log(cx)}{d^3}-\frac{be^3\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^4}-\frac{be^2x}{d^3}+\frac{bex^2}{4d^2}-\frac{bx^3}{9d}$$

input
```
Int[(x^2*(a + b*Log[c*x]))/(d + e/x),x]
```

output
```
(a*e^2*x)/d^3 - (b*e^2*x)/d^3 + (b*e*x^2)/(4*d^2) - (b*x^3)/(9*d) + (b*e^2
*x*Log[c*x])/d^3 - (e*x^2*(a + b*Log[c*x]))/(2*d^2) + (x^3*(a + b*Log[c*x]
))/(3*d) - (e^3*(a + b*Log[c*x])*Log[1 + (d*x)/e])/d^4 - (b*e^3*PolyLog[2,
 -((d*x)/e)])/d^4
```

3.338.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.338.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 168, normalized size of antiderivative = 1.24

method	result
risch	$\frac{a\,x^3}{3d}-\frac{ae\,x^2}{2d^2}+\frac{a\,e^2x}{d^3}-\frac{a\,e^3\ln(dx+e)}{d^4}+\frac{b\,x^3\ln(xc)}{3d}-\frac{b\,x^3}{9d}-\frac{be\,x^2\ln(xc)}{2d^2}+\frac{be\,x^2}{4d^2}+\frac{b\,e^2x\ln(xc)}{d^3}-\frac{b\,e^2x}{d^3}$
parts	$\frac{a\,x^3}{3d}-\frac{ae\,x^2}{2d^2}+\frac{a\,e^2x}{d^3}-\frac{a\,e^3\ln(dx+e)}{d^4}+\frac{b\,x^3\ln(xc)}{3d}-\frac{b\,x^3}{9d}-\frac{be\,x^2\ln(xc)}{2d^2}+\frac{be\,x^2}{4d^2}+\frac{b\,e^2x\ln(xc)}{d^3}-\frac{b\,e^2x}{d^3}$
derivativedivides	$\frac{\frac{a\,c^3e^2x}{d^3}-\frac{a\,c^3e\,x^2}{2d^2}+\frac{a\,x^3c^3}{3d}-\frac{a\,c^3e^3\ln(cdx+ce)}{d^4}+b\left(\frac{\frac{x^3c^3\ln(xc)}{3}-\frac{x^3c^3}{9}}{d}-\frac{ce\left(\frac{x^2c^2\ln(xc)}{2}-\frac{x^2c^2}{4}\right)}{d^2}+\frac{c^2e^2(xc\ln(xc)-xc)}{d^3}-\frac{c^3e^3 \cdots}{}\right.}{c^3}$
default	$\frac{\frac{a\,c^3e^2x}{d^3}-\frac{a\,c^3e\,x^2}{2d^2}+\frac{a\,x^3c^3}{3d}-\frac{a\,c^3e^3\ln(cdx+ce)}{d^4}+b\left(\frac{\frac{x^3c^3\ln(xc)}{3}-\frac{x^3c^3}{9}}{d}-\frac{ce\left(\frac{x^2c^2\ln(xc)}{2}-\frac{x^2c^2}{4}\right)}{d^2}+\frac{c^2e^2(xc\ln(xc)-xc)}{d^3}-\frac{c^3e^3 \cdots}{}\right.}{c^3}$

input
```
int(x^2*(a+b*ln(x*c))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
1/3*a/d*x^3-1/2*a*e/d^2*x^2+a*e^2*x/d^3-a*e^3/d^4*ln(d*x+e)+1/3*b/d*x^3*ln
(x*c)-1/9*b*x^3/d-1/2*b/d^2*e*x^2*ln(x*c)+1/4*b*e*x^2/d^2+b*e^2*x*ln(x*c)/
d^3-b*e^2*x/d^3-b*e^3/d^4*dilog((c*d*x+c*e)/e/c)-b*e^3/d^4*ln(x*c)*ln((c*d
*x+c*e)/e/c)
```

3.338.5 Fricas [F]

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx)+a)x^2}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x) + a*x^3)/(d*x + e), x)
```

3.338.6 Sympy [A] (verification not implemented)

Time = 79.52 (sec) , antiderivative size = 253, normalized size of antiderivative = 1.86

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \frac{ax^3}{3d} - \frac{aex^2}{2d^2} - \frac{ae^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d^3} + \frac{ae^2x}{d^3} + \frac{bx^3\log(cx)}{3d} - \frac{bx^3}{9d} - \frac{bex^2\log(cx)}{2d^2} + \frac{bex^2}{4d^2} + \frac{be^3\left(\begin{cases}\frac{x}{e} & \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d} & \end{cases}\right)}{d^3} - \frac{be^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx)}{d^3} + \frac{be^2x\log(cx)}{d^3} - \frac{be^2x}{d^3}$$

input
```
integrate(x**2*(a+b*ln(c*x))/(d+e/x),x)
```

output
```
a*x**3/(3*d) - a*e*x**2/(2*d**2) - a*e**3*Piecewise((x/e, Eq(d, 0)), (log(
d*x + e)/d, True))/d**3 + a*e**2*x/d**3 + b*x**3*log(c*x)/(3*d) - b*x**3/(
9*d) - b*e*x**2*log(c*x)/(2*d**2) + b*e*x**2/(4*d**2) + b*e**3*Piecewise((
x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs(x) <
1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)/e),
Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1/Abs(
x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1)
, ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), True))
/d, True))/d**3 - b*e**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True)
)*log(c*x)/d**3 + b*e**2*x*log(c*x)/d**3 - b*e**2*x/d**3
```

3.338.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 164, normalized size of antiderivative = 1.21

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx = -\frac{\left(\log\left(\frac{dx}{e}+1\right)\log\left(x\right)+\mathrm{Li}_2\left(-\frac{dx}{e}\right)\right)be^3}{d^4} + \frac{4\,(3\,ad^2+(3\,d^2\log\left(c\right)-d^2)b)x^3-9\,(2\,ade+(2\,de\log\left(c\right)-de)b)x^2+36\,(ae^2+(e^2\log\left(c\right)-e^2)b)x+6}{36\,d^3} - \frac{(be^3\log\left(c\right)+ae^3)\log\left(dx+e\right)}{d^4}$$

input
```
integrate(x^2*(a+b*log(c*x))/(d+e/x),x, algorithm="maxima")
```

output
```
-(log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b*e^3/d^4 + 1/36*(4*(3*a*d^2 + (3
*d^2*log(c) - d^2)*b)*x^3 - 9*(2*a*d*e + (2*d*e*log(c) - d*e)*b)*x^2 + 36*
(a*e^2 + (e^2*log(c) - e^2)*b)*x + 6*(2*b*d^2*x^3 - 3*b*d*e*x^2 + 6*b*e^2*
x)*log(x))/d^3 - (b*e^3*log(c) + a*e^3)*log(d*x + e)/d^4
```

3.338.8 Giac [F]

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log\left(cx\right)+a)x^2}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)*x^2/(d + e/x), x)
```

3.338.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x^2(a+b\log(cx))}{d+\frac{e}{x}}\,dx=\int \frac{x^2\,\left(a+b\,\ln\left(c\,x\right)\right)}{d+\frac{e}{x}}\,dx$$

input
```
int((x^2*(a + b*log(c*x)))/(d + e/x),x)
```

output
```
int((x^2*(a + b*log(c*x)))/(d + e/x), x)
```

3.339 $\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx$

3.339.1 Optimal result

Integrand size = 19, antiderivative size = 98

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx = -\frac{aex}{d^2}+\frac{bex}{d^2}-\frac{bx^2}{4d}-\frac{bex\log(cx)}{d^2}+\frac{x^2(a+b\log(cx))}{2d}+\frac{e^2(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d^3}+\frac{be^2\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^3}$$

output
```
-a*e*x/d^2+b*e*x/d^2-1/4*b*x^2/d-b*e*x*ln(c*x)/d^2+1/2*x^2*(a+b*ln(c*x))/d
+e^2*(a+b*ln(c*x))*ln(1+d*x/e)/d^3+b*e^2*polylog(2,-d*x/e)/d^3
```

3.339.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 99, normalized size of antiderivative = 1.01

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx = -\frac{aex}{d^2}+\frac{bex}{d^2}-\frac{bx^2}{4d}-\frac{bex\log(cx)}{d^2}+\frac{x^2(a+b\log(cx))}{2d}+\frac{e^2(a+b\log(cx))\log\left(\frac{e+dx}{e}\right)}{d^3}+\frac{be^2\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^3}$$

input
```
Integrate[(x*(a + b*Log[c*x]))/(d + e/x),x]
```

output
```
-((a*e*x)/d^2) + (b*e*x)/d^2 - (b*x^2)/(4*d) - (b*e*x*Log[c*x])/d^2 + (x^2
*(a + b*Log[c*x]))/(2*d) + (e^2*(a + b*Log[c*x])*Log[(e + d*x)/e])/d^3 + (
b*e^2*PolyLog[2, -((d*x)/e)])/d^3
```

3.339.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$, Rules used = {2005, 2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{x^2(a+b\log(cx))}{dx+e}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{e^2(a+b\log(cx))}{d^2(dx+e)}-\frac{e(a+b\log(cx))}{d^2}+\frac{x(a+b\log(cx))}{d}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{e^2\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d^3}+\frac{x^2(a+b\log(cx))}{2d}-\frac{aex}{d^2}-\frac{bex\log(cx)}{d^2}+\frac{be^2\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^3}+\frac{bex}{d^2}-\frac{bx^2}{4d}$$

input
```
Int[(x*(a + b*Log[c*x]))/(d + e/x),x]
```

output
```
-((a*e*x)/d^2) + (b*e*x)/d^2 - (b*x^2)/(4*d) - (b*e*x*Log[c*x])/d^2 + (x^2
*(a + b*Log[c*x]))/(2*d) + (e^2*(a + b*Log[c*x])*Log[1 + (d*x)/e])/d^3 + (
b*e^2*PolyLog[2, -((d*x)/e)])/d^3
```

3.339.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.339.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 126, normalized size of antiderivative = 1.29

method	result
risch	$\frac{a\,x^2}{2d}-\frac{aex}{d^2}+\frac{a\,e^2\ln(dx+e)}{d^3}+\frac{b\,x^2\ln(xc)}{2d}-\frac{b\,x^2}{4d}-\frac{bex\ln(xc)}{d^2}+\frac{bex}{d^2}+\frac{b\,e^2\operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^3}+\frac{b\,e^2\ln(xc)\ln(}{d^3}$
parts	$\frac{a\,x^2}{2d}-\frac{aex}{d^2}+\frac{a\,e^2\ln(dx+e)}{d^3}+\frac{b\,x^2\ln(xc)}{2d}-\frac{b\,x^2}{4d}-\frac{bex\ln(xc)}{d^2}+\frac{bex}{d^2}+\frac{b\,e^2\operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^3}+\frac{b\,e^2\ln(xc)\ln(}{d^3}$
derivativedivides	$\frac{-\frac{a\,c^2ex}{d^2}+\frac{a\,x^2c^2}{2d}+\frac{a\,c^2e^2\ln(cdx+ce)}{d^3}+b\left(\frac{\frac{x^2c^2\ln(xc)}{2}-\frac{x^2c^2}{4}}{d}-\frac{ec(xc\ln(xc)-xc)}{d^2}+\frac{c^2e^2\left(\frac{\operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}\right)}{d^2}\right.}{c^2}$
default	$\frac{-\frac{a\,c^2ex}{d^2}+\frac{a\,x^2c^2}{2d}+\frac{a\,c^2e^2\ln(cdx+ce)}{d^3}+b\left(\frac{\frac{x^2c^2\ln(xc)}{2}-\frac{x^2c^2}{4}}{d}-\frac{ec(xc\ln(xc)-xc)}{d^2}+\frac{c^2e^2\left(\frac{\operatorname{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}\right)}{d^2}\right.}{c^2}$

input
```
int(x*(a+b*ln(x*c))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
1/2*a*x^2/d-a*e*x/d^2+a*e^2/d^3*ln(d*x+e)+1/2*b/d*x^2*ln(x*c)-1/4*b*x^2/d-
b*e*x*ln(x*c)/d^2+b*e*x/d^2+b*e^2/d^3*dilog((c*d*x+c*e)/e/c)+b*e^2/d^3*ln(
x*c)*ln((c*d*x+c*e)/e/c)
```

3.339.5 Fricas [F]

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx=\int \frac{(b\log(cx)+a)x}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x*(a+b*log(c*x))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x) + a*x^2)/(d*x + e), x)
```

3.339.6 Sympy [A] (verification not implemented)

Time = 52.73 (sec) , antiderivative size = 207, normalized size of antiderivative = 2.11

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \frac{ax^2}{2d} + \frac{ae^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d^2} - \frac{aex}{d^2} + \frac{bx^2\log(cx)}{2d} - \frac{bx^2}{4d} - \frac{be^2\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{d^2} + \frac{be^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx)}{d^2} - \frac{bex\log(cx)}{d^2} + \frac{bex}{d^2}$$

input
```
integrate(x*(a+b*ln(c*x))/(d+e/x),x)
```

output
```
a*x**2/(2*d) + a*e**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d
**2 - a*e*x/d**2 + b*x**2*log(c*x)/(2*d) - b*x**2/(4*d) - b*e**2*Piecewise
((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs(x)
< 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)/e)
, Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1/Ab
s(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1,
1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), True
))/d, True))/d**2 + b*e**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, Tru
e))*log(c*x)/d**2 - b*e*x*log(c*x)/d**2 + b*e*x/d**2
```

3.339.7 Maxima [A] (verification not implemented)

Time = 0.24 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.14

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx$$
$$= \frac{\left(\log\left(\frac{dx}{e}+1\right)\log(x)+\mathrm{Li}_2\left(-\frac{dx}{e}\right)\right)be^2}{d^3} + \frac{((2\,d\log(c)-d)b+2\,ad)x^2-4\,((e\log(c)-e)b+ae)x+2\,(bdx^2-2\,bex)\log(x)}{4\,d^2} + \frac{(be^2\log(c)+ae^2)\log(dx+e)}{d^3}$$

input
```
integrate(x*(a+b*log(c*x))/(d+e/x),x, algorithm="maxima")
```

output
```
(log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b*e^2/d^3 + 1/4*(((2*d*log(c) - d)
*b + 2*a*d)*x^2 - 4*((e*log(c) - e)*b + a*e)*x + 2*(b*d*x^2 - 2*b*e*x)*log
(x))/d^2 + (b*e^2*log(c) + a*e^2)*log(d*x + e)/d^3
```

3.339.8 Giac [F]

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \int \frac{(b\log(cx)+a)x}{d+\frac{e}{x}}\,dx$$

input
```
integrate(x*(a+b*log(c*x))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)*x/(d + e/x), x)
```

3.339.9 Mupad [F(-1)]

Timed out.

$$\int \frac{x(a+b\log(cx))}{d+\frac{e}{x}}\,dx = \int \frac{x\,(a+b\,\ln(c\,x))}{d+\frac{e}{x}}\,dx$$

input
```
int((x*(a + b*log(c*x)))/(d + e/x),x)
```

output
```
int((x*(a + b*log(c*x)))/(d + e/x), x)
```

3.340 $\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx$

3.340.1 Optimal result

Integrand size = 18, antiderivative size = 63

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx = \frac{ax}{d}-\frac{bx}{d}+\frac{bx\log(cx)}{d}-\frac{e(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d^2} - \frac{be\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}$$

output
```
a*x/d-b*x/d+b*x*ln(c*x)/d-e*(a+b*ln(c*x))*ln(1+d*x/e)/d^2-b*e*polylog(2,-d
*x/e)/d^2
```

3.340.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.02

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx = \frac{ax}{d}-\frac{bx}{d}+\frac{bx\log(cx)}{d}-\frac{e(a+b\log(cx))\log\left(\frac{e+dx}{e}\right)}{d^2}-\frac{be\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}$$

input
```
Integrate[(a + b*Log[c*x])/(d + e/x),x]
```

output
```
(a*x)/d - (b*x)/d + (b*x*Log[c*x])/d - (e*(a + b*Log[c*x])*Log[(e + d*x)/e
])/d^2 - (b*e*PolyLog[2, -((d*x)/e)])/d^2
```

3.340.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2767, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx$$

$$\Big\downarrow \ 2767$$

$$\int \left(\frac{a+b\log(cx)}{d}-\frac{e(a+b\log(cx))}{d(dx+e)}\right)dx$$

$$\Big\downarrow \ 2009$$

$$-\frac{e\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d^2}+\frac{ax}{d}+\frac{bx\log(cx)}{d}-\frac{be\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d^2}-\frac{bx}{d}$$

input
```
Int[(a + b*Log[c*x])/(d + e/x),x]
```

output
```
(a*x)/d - (b*x)/d + (b*x*Log[c*x])/d - (e*(a + b*Log[c*x])*Log[1 + (d*x)/e
])/d^2 - (b*e*PolyLog[2, -((d*x)/e)])/d^2
```

3.340.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2767
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[c*x^n])^p, (d + e*x
^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e, n, p, q, r}, x]
&& IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0] && IntegerQ[r]))
```

3.340.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 88, normalized size of antiderivative = 1.40

method	result	size
risch	$\frac{ax}{d}-\frac{ae\ln(dx+e)}{d^2}+\frac{bx\ln(xc)}{d}-\frac{bx}{d}-\frac{be\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^2}-\frac{be\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d^2}$	88
parts	$\frac{ax}{d}-\frac{ae\ln(dx+e)}{d^2}+\frac{bx\ln(xc)}{d}-\frac{bx}{d}-\frac{be\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d^2}-\frac{be\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d^2}$	88
derivativedivides	$\frac{\frac{axc}{d}-\frac{aec\ln(cdx+ce)}{d^2}+b\left(\frac{xc\ln(xc)-xc}{d}-\frac{ec\left(\frac{\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}\right)}{d}\right)}{c}$	101
default	$\frac{\frac{axc}{d}-\frac{aec\ln(cdx+ce)}{d^2}+b\left(\frac{xc\ln(xc)-xc}{d}-\frac{ec\left(\frac{\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}\right)}{d}\right)}{c}$	101

input
```
int((a+b*ln(x*c))/(d+e/x),x,method=_RETURNVERBOSE)
```

output
```
a*x/d-a*e/d^2*ln(d*x+e)+b*x*ln(x*c)/d-b*x/d-b*e/d^2*dilog((c*d*x+c*e)/e/c)
-b*e/d^2*ln(x*c)*ln((c*d*x+c*e)/e/c)
```

3.340.5 Fricas [F]

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx=\int \frac{b\log\left(cx\right)+a}{d+\frac{e}{x}}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x),x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x) + a*x)/(d*x + e), x)
```

3.340.6 Sympy [A] (verification not implemented)

Time = 43.43 (sec) , antiderivative size = 156, normalized size of antiderivative = 2.48

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx = -\frac{ae\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{d}+\frac{ax}{d} + \frac{be\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{d} - \frac{be\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx)}{d}+\frac{bx\log(cx)}{d}-\frac{bx}{d}$$

input
```
integrate((a+b*ln(c*x))/(d+e/x),x)
```

output
```
-a*e*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/d + a*x/d + b*e*Pi
ecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (
Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I
*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e
), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijer
g(((1, 1), ()), ((), (0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e
), True))/d, True))/d - b*e*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, Tr
ue))*log(c*x)/d + b*x*log(c*x)/d - b*x/d
```

3.340.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx = -\frac{\left(\log\left(\frac{dx}{e}+1\right)\log(x)+\mathrm{Li}_2\left(-\frac{dx}{e}\right)\right)be}{d^2} + \frac{bx\log(x)+(b(\log(c)-1)+a)x}{d} - \frac{(be\log(c)+ae)\log(dx+e)}{d^2}$$

input
```
integrate((a+b*log(c*x))/(d+e/x),x, algorithm="maxima")
```

output
```
-(log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b*e/d^2 + (b*x*log(x) + (b*(log(c
) - 1) + a)*x)/d - (b*e*log(c) + a*e)*log(d*x + e)/d^2
```

3.340.8 Giac [F]

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx = \int \frac{b\log(cx)+a}{d+\frac{e}{x}}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x),x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)/(d + e/x), x)
```

3.340.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx)}{d+\frac{e}{x}}\,dx = \int \frac{a+b\,\ln(c\,x)}{d+\frac{e}{x}}\,dx$$

input
```
int((a + b*log(c*x))/(d + e/x),x)
```

output
```
int((a + b*log(c*x))/(d + e/x), x)
```

3.341 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx$

3.341.1 Optimal result

Integrand size = 21, antiderivative size = 36

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx=\frac{(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{d}+\frac{b\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}$$

output
```
(a+b*ln(c*x))*ln(1+d*x/e)/d+b*polylog(2,-d*x/e)/d
```

3.341.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 34, normalized size of antiderivative = 0.94

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx=\frac{(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)+b\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}$$

input
```
Integrate[(a + b*Log[c*x])/((d + e/x)*x),x]
```

output
```
((a + b*Log[c*x])*Log[1 + (d*x)/e] + b*PolyLog[2, -((d*x)/e)])/d
```

3.341.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2005, 2754, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx)}{x\left(d+\frac{e}{x}\right)}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{a+b\log(cx)}{dx+e}dx$$

$$\Big\downarrow \text{2754}$$

$$\frac{\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d}-\frac{b\int \frac{\log\left(\frac{dx}{e}+1\right)}{x}dx}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\log\left(\frac{dx}{e}+1\right)(a+b\log(cx))}{d}+\frac{b\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{d}$$

input
```
Int[(a + b*Log[c*x])/((d + e/x)*x),x]
```

output
```
((a + b*Log[c*x])*Log[1 + (d*x)/e])/d + (b*PolyLog[2, -((d*x)/e)])/d
```

3.341.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2754
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symb
ol] :> Simp[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^p/e), x] - Simp[b*n*(p/e)
  Int[Log[1 + e*(x/d)]*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a,
b, c, d, e, n}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.341.4 Maple [A] (verified)

Time = 0.03 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.64

method	result	size
risch	$\frac{a\ln(dx+e)}{d}+\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}$	59
parts	$\frac{a\ln(dx+e)}{d}+\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}$	59
derivativedivides	$\frac{a\ln(cdx+ce)}{d}+\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}$	62
default	$\frac{a\ln(cdx+ce)}{d}+\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{d}$	62

input
```
int((a+b*ln(x*c))/(d+e/x)/x,x,method=_RETURNVERBOSE)
```

output
```
a*ln(d*x+e)/d+b*dilog((c*d*x+c*e)/e/c)/d+b*ln(x*c)*ln((c*d*x+c*e)/e/c)/d
```

3.341.5 Fricas [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx=\int \frac{b\log\left(cx\right)+a}{\left(d+\frac{e}{x}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x,x, algorithm="fricas")
```

output
```
integral((b*log(c*x) + a)/(d*x + e), x)
```

3.341.6 Sympy [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx = \int \frac{a+b\log{(cx)}}{dx+e}\,dx$$

input
```
integrate((a+b*ln(c*x))/(d+e/x)/x,x)
```

output
```
Integral((a + b*log(c*x))/(d*x + e), x)
```

3.341.7 Maxima [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.19

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx = \frac{\left(\log\left(\frac{dx}{e}+1\right)\log{(x)}+\mathrm{Li}_2\left(-\frac{dx}{e}\right)\right)b}{d} + \frac{(b\log{(c)}+a)\log{(dx+e)}}{d}$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x,x, algorithm="maxima")
```

output
```
(log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b/d + (b*log(c) + a)*log(d*x + e)/
d
```

3.341.8 Giac [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx = \int \frac{b\log{(cx)}+a}{\left(d+\frac{e}{x}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x,x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)/((d + e/x)*x), x)
```

3.341.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x}\,dx=\int \frac{a+b\,\ln\left(c\,x\right)}{x\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x))/(x*(d + e/x)),x)
```

output
```
int((a + b*log(c*x))/(x*(d + e/x)), x)
```

3.342 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx$

3.342.1 Optimal result

Integrand size = 21, antiderivative size = 41

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx=-\frac{\log\left(1+\frac{e}{dx}\right)(a+b\log(cx))}{e}+\frac{b\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}$$

output
```
-ln(1+e/d/x)*(a+b*ln(c*x))/e+b*polylog(2,-e/d/x)/e
```

3.342.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.32

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx=\frac{(a+b\log(cx))\left(a+b\log(cx)-2b\log\left(1+\frac{dx}{e}\right)\right)-2b^2\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{2be}$$

input
```
Integrate[(a + b*Log[c*x])/((d + e/x)*x^2),x]
```

output
```
((a + b*Log[c*x])*(a + b*Log[c*x] - 2*b*Log[1 + (d*x)/e]) - 2*b^2*PolyLog[
2, -((d*x)/e)])/(2*b*e)
```

3.342.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {2005, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx)}{x^2\left(d+\frac{e}{x}\right)}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{a+b\log(cx)}{x(dx+e)}dx$$

$$\Big\downarrow \text{2779}$$

$$\frac{b\int \frac{\log\left(\frac{e}{dx}+1\right)}{x}dx}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx))}{e}$$

$$\Big\downarrow \text{2838}$$

$$\frac{b\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx))}{e}$$

input
```
Int[(a + b*Log[c*x])/((d + e/x)*x^2),x]
```

output
```
-((Log[1 + e/(d*x)]*(a + b*Log[c*x]))/e) + (b*PolyLog[2, -(e/(d*x))])/e
```

3.342.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.342.4 Maple [A] (verified)

Time = 0.04 (sec) , antiderivative size = 81, normalized size of antiderivative = 1.98

method	result	size
risch	$-\frac{a\ln(dx+e)}{e}+\frac{a\ln(x)}{e}-\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{e}-\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{e}+\frac{b\ln(xc)^2}{2e}$	81
parts	$-\frac{a\ln(dx+e)}{e}+\frac{a\ln(x)}{e}-\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{e}-\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{e}+\frac{b\ln(xc)^2}{2e}$	81
derivativedivides	$c\left(\frac{a\ln(xc)}{ec}-\frac{a\ln(cdx+ce)}{ec}+\frac{b\ln(xc)^2}{2ec}-\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{ec}-\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{ec}\right)$	103
default	$c\left(\frac{a\ln(xc)}{ec}-\frac{a\ln(cdx+ce)}{ec}+\frac{b\ln(xc)^2}{2ec}-\frac{b\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{ec}-\frac{b\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{ec}\right)$	103

input
```
int((a+b*ln(x*c))/(d+e/x)/x^2,x,method=_RETURNVERBOSE)
```

output
```
-a/e*ln(d*x+e)+a/e*ln(x)-b/e*dilog((c*d*x+c*e)/e/c)-b/e*ln(x*c)*ln((c*d*x+
c*e)/e/c)+1/2*b/e*ln(x*c)^2
```

3.342.5 Fricas [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx=\int \frac{b\log(cx)+a}{\left(d+\frac{e}{x}\right)x^2}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x) + a)/(d*x^2 + e*x), x)
```

3.342.6 Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 5.95 (sec) , antiderivative size = 170, normalized size of antiderivative = 4.15

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \frac{2ad\left(\begin{cases}-\frac{x}{e}-\frac{1}{2d} & \text{for } d=0\\ \frac{\log(2dx)}{2d} & \text{otherwise}\end{cases}\right)}{e} - \frac{2ad\left(\begin{cases}\frac{x}{e}+\frac{1}{2d} & \text{for } d=0\\ \frac{\log(2dx+2e)}{2d} & \text{otherwise}\end{cases}\right)}{e}$$

$$+b\left(\begin{cases}-\frac{1}{dx} & \text{fo}\\ \frac{\begin{cases}\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)+\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)+\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle|\, x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle|\, x\right)\log(d)+\operatorname{Li}_2\left(\frac{ee^{i\pi}}{dx}\right) & \text{otherwise}\end{cases}}{e} & \text{ot}\end{cases}\right)$$

$$-b\left(\begin{cases}\frac{1}{dx} & \text{for } e=0\\ \frac{\log\left(d+\frac{e}{x}\right)}{e} & \text{otherwise}\end{cases}\right)\log(cx)$$

input
```
integrate((a+b*ln(c*x))/(d+e/x)/x**2,x)
```

output
```
2*a*d*Piecewise((-x/e - 1/(2*d), Eq(d, 0)), (log(2*d*x)/(2*d), True))/e -
2*a*d*Piecewise((x/e + 1/(2*d), Eq(d, 0)), (log(2*d*x + 2*e)/(2*d), True))
/e + b*Piecewise((-1/(d*x), Eq(e, 0)), (Piecewise((polylog(2, e*exp_polar(
I*pi)/(d*x)), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) + polylog(2,
e*exp_polar(I*pi)/(d*x)), Abs(x) < 1), (-log(d)*log(1/x) + polylog(2, e*ex
p_polar(I*pi)/(d*x)), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0, 0), ()),
 x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d) + polylog(2, e*
exp_polar(I*pi)/(d*x)), True))/e, True)) - b*Piecewise((1/(d*x), Eq(e, 0))
, (log(d + e/x)/e, True))*log(c*x)
```

3.342.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 67, normalized size of antiderivative = 1.63

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \frac{b\log{(x)}^2}{2\,e} - \frac{\left(\log\left(\frac{dx}{e}+1\right)\log{(x)} + \mathrm{Li}_2\left(-\frac{dx}{e}\right)\right)b}{e} - \frac{(b\log{(c)}+a)\log{(dx+e)}}{e} + \frac{(b\log{(c)}+a)\log{(x)}}{e}$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^2,x, algorithm="maxima")
```

output
```
1/2*b*log(x)^2/e - (log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b/e - (b*log(c)
 + a)*log(d*x + e)/e + (b*log(c) + a)*log(x)/e
```

3.342.8 Giac [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \int \frac{b\log{(cx)}+a}{\left(d+\frac{e}{x}\right)x^2}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)/((d + e/x)*x^2), x)
```

3.342.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^2}\,dx = \int \frac{a+b\,\ln{(c\,x)}}{x^2\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x))/(x^2*(d + e/x)),x)
```

output
```
int((a + b*log(c*x))/(x^2*(d + e/x)), x)
```

3.343 $\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx$

3.343.1 Optimal result

Integrand size = 21, antiderivative size = 84

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx = -\frac{b}{ex}-\frac{a+b\log(cx)}{ex}-\frac{d(a+b\log(cx))^2}{2be^2}+\frac{d(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{e^2}+\frac{bd\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{e^2}$$

output
```
-b/e/x+(-a-b*ln(c*x))/e/x-1/2*d*(a+b*ln(c*x))^2/b/e^2+d*(a+b*ln(c*x))*ln(1
+d*x/e)/e^2+b*d*polylog(2,-d*x/e)/e^2
```

3.343.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 77, normalized size of antiderivative = 0.92

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx = -\frac{\frac{2be}{x}+\frac{2e(a+b\log(cx))}{x}+\frac{d(a+b\log(cx))^2}{b}-2d(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)-2bd\,\text{PolyLog}\left(2,-\frac{dx}{e}\right)}{2e^2}$$

input
```
Integrate[(a + b*Log[c*x])/((d + e/x)*x^3),x]
```

output
```
-1/2*((2*b*e)/x + (2*e*(a + b*Log[c*x]))/x + (d*(a + b*Log[c*x])^2)/b - 2*
d*(a + b*Log[c*x])*Log[1 + (d*x)/e] - 2*b*d*PolyLog[2, -((d*x)/e)])/e^2
```

3.343.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 72, normalized size of antiderivative = 0.86, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {2005, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx)}{x^3\left(d+\frac{e}{x}\right)}\,dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{a+b\log(cx)}{x^2(dx+e)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx)}{x^2}dx}{e}-\frac{d\int \frac{a+b\log(cx)}{x(e+dx)}dx}{e}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx)}{x}-\frac{b}{x}}{e}-\frac{d\int \frac{a+b\log(cx)}{x(e+dx)}dx}{e}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx)}{x}-\frac{b}{x}}{e}-\frac{d\left(\frac{b\int \frac{\log\left(\frac{e}{dx}+1\right)}{x}dx}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx))}{e}\right)}{e}$$

$$\Big\downarrow \text{2838}$$

$$\frac{-\frac{a+b\log(cx)}{x}-\frac{b}{x}}{e}-\frac{d\left(\frac{b\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx))}{e}\right)}{e}$$

input
```
Int[(a + b*Log[c*x])/((d + e/x)*x^3),x]
```

output
```
(-(b/x) - (a + b*Log[c*x])/x)/e - (d*(-((Log[1 + e/(d*x)]*(a + b*Log[c*x])
)/e) + (b*PolyLog[2, -(e/(d*x))])/e))/e
```

3.343.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.343.4 Maple [A] (verified)

Time = 0.05 (sec) , antiderivative size = 115, normalized size of antiderivative = 1.37

method	result
risch	$\frac{ad\ln(dx+e)}{e^2}-\frac{a}{ex}-\frac{ad\ln(x)}{e^2}+\frac{bd\,\text{dilog}\left(\frac{cdx+ce}{ec}\right)}{e^2}+\frac{bd\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{e^2}-\frac{b\ln(xc)}{ex}-\frac{b}{ex}-\frac{bd\ln(xc)^2}{2e^2}$
parts	$a\left(\frac{d\ln(dx+e)}{e^2}-\frac{1}{ex}-\frac{d\ln(x)}{e^2}\right)+\frac{bd\,\text{dilog}\left(\frac{cdx+ce}{ec}\right)}{e^2}+\frac{bd\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{e^2}-\frac{b\ln(xc)}{ex}-\frac{b}{ex}-\frac{bd\ln(xc)^2}{2e^2}$
derivativedivides	$c^2\left(a\left(-\frac{1}{e\,c^2x}-\frac{d\ln(xc)}{e^2c^2}+\frac{d\ln(cdx+ce)}{e^2c^2}\right)+b\left(-\frac{d\ln(xc)^2}{2e^2c^2}+\frac{-\frac{\ln(xc)}{xc}-\frac{1}{xc}}{ec}+\frac{d^2\left(\frac{\text{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln}{}\right.}{e^2c^2}\right.\right.$
default	$c^2\left(a\left(-\frac{1}{e\,c^2x}-\frac{d\ln(xc)}{e^2c^2}+\frac{d\ln(cdx+ce)}{e^2c^2}\right)+b\left(-\frac{d\ln(xc)^2}{2e^2c^2}+\frac{-\frac{\ln(xc)}{xc}-\frac{1}{xc}}{ec}+\frac{d^2\left(\frac{\text{dilog}\left(\frac{cdx+ce}{ec}\right)}{d}+\frac{\ln(xc)\ln}{}\right.}{e^2c^2}\right.\right.$

input
```
int((a+b*ln(x*c))/(d+e/x)/x^3,x,method=_RETURNVERBOSE)
```

output
```
a*d/e^2*ln(d*x+e)-a/e/x-a*d/e^2*ln(x)+b/e^2*d*dilog((c*d*x+c*e)/e/c)+b/e^2
*d*ln(x*c)*ln((c*d*x+c*e)/e/c)-b/e*ln(x*c)/x-b/e/x-1/2*b/e^2*d*ln(x*c)^2
```

3.343.5 Fricas [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx=\int \frac{b\log(cx)+a}{\left(d+\frac{e}{x}\right)x^3}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^3,x, algorithm="fricas")
```

output
```
integral((b*log(c*x) + a)/(d*x^3 + e*x^2), x)
```

3.343.6 Sympy [A] (verification not implemented)

Time = 37.73 (sec) , antiderivative size = 206, normalized size of antiderivative = 2.45

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \frac{ad^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{e^2} - \frac{ad\log(x)}{e^2} - \frac{a}{ex}$$

$$- \frac{bd^2\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{e^2}$$

$$+ \frac{bd^2\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx)}{e^2} + \frac{bd\log(x)^2}{2e^2} - \frac{bd\log(x)\log(cx)}{e^2} - \frac{b\log(cx)}{ex} - \frac{b}{ex}$$

input
```
integrate((a+b*ln(c*x))/(d+e/x)/x**3,x)
```

output
```
a*d**2*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/e**2 - a*d*log(x
)/e**2 - a/(e*x) - b*d**2*Piecewise((x/e, Eq(d, 0)), (Piecewise((-polylog(
2, d*x*exp_polar(I*pi)/e), (Abs(x) < 1) & (1/Abs(x) < 1)), (log(e)*log(x)
- polylog(2, d*x*exp_polar(I*pi)/e), Abs(x) < 1), (-log(e)*log(1/x) - poly
log(2, d*x*exp_polar(I*pi)/e), 1/Abs(x) < 1), (-meijerg(((), (1, 1)), ((0,
 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(e) - poly
log(2, d*x*exp_polar(I*pi)/e), True))/d, True))/e**2 + b*d**2*Piecewise((x
/e, Eq(d, 0)), (log(d*x + e)/d, True))*log(c*x)/e**2 + b*d*log(x)**2/(2*e*
*2) - b*d*log(x)*log(c*x)/e**2 - b*log(c*x)/(e*x) - b/(e*x)
```

3.343.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.14

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \frac{\left(\log\left(\frac{dx}{e}+1\right)\log(x)+\mathrm{Li}_2\left(-\frac{dx}{e}\right)\right)bd}{e^2} + \frac{(bd\log(c)+ad)\log(dx+e)}{e^2} - \frac{bdx\log(x)^2+2\,(e\log(c)+e)b+2\,ae+2\,(be+(bd\log(c)+ad)x)\log(x)}{2\,e^2x}$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^3,x, algorithm="maxima")
```

output
```
(log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b*d/e^2 + (b*d*log(c) + a*d)*log(d
*x + e)/e^2 - 1/2*(b*d*x*log(x)^2 + 2*(e*log(c) + e)*b + 2*a*e + 2*(b*e +
(b*d*log(c) + a*d)*x)*log(x))/(e^2*x)
```

3.343.8 Giac [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \int \frac{b\log(cx)+a}{\left(d+\frac{e}{x}\right)x^3}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)/((d + e/x)*x^3), x)
```

3.343.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^3}\,dx = \int \frac{a+b\,\ln(c\,x)}{x^3\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x))/(x^3*(d + e/x)),x)
```

output
```
int((a + b*log(c*x))/(x^3*(d + e/x)), x)
```

3.344 $\int \frac{a+b\log(cx)}{(d+\frac{e}{x})x^4}\,dx$

3.344.1 Optimal result

Integrand size = 21, antiderivative size = 121

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx=-\frac{b}{4ex^2}+\frac{bd}{e^2x}-\frac{a+b\log(cx)}{2ex^2}+\frac{d(a+b\log(cx))}{e^2x}+\frac{d^2(a+b\log(cx))^2}{2be^3}-\frac{d^2(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)}{e^3}-\frac{bd^2\operatorname{PolyLog}\left(2,-\frac{dx}{e}\right)}{e^3}$$

output
```
-1/4*b/e/x^2+b*d/e^2/x+1/2*(-a-b*ln(c*x))/e/x^2+d*(a+b*ln(c*x))/e^2/x+1/2*
d^2*(a+b*ln(c*x))^2/b/e^3-d^2*(a+b*ln(c*x))*ln(1+d*x/e)/e^3-b*d^2*polylog(
2,-d*x/e)/e^3
```

3.344.2 Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 110, normalized size of antiderivative = 0.91

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx = -\frac{\frac{be^2}{x^2}-\frac{4bde}{x}+\frac{2e^2(a+b\log(cx))}{x^2}-\frac{4de(a+b\log(cx))}{x}-\frac{2d^2(a+b\log(cx))^2}{b}+4d^2(a+b\log(cx))\log\left(1+\frac{dx}{e}\right)+4bd^2\operatorname{Poly}}{4e^3}$$

input
```
Integrate[(a + b*Log[c*x])/((d + e/x)*x^4),x]
```

output
```
-1/4*((b*e^2)/x^2 - (4*b*d*e)/x + (2*e^2*(a + b*Log[c*x]))/x^2 - (4*d*e*(a
 + b*Log[c*x]))/x - (2*d^2*(a + b*Log[c*x])^2)/b + 4*d^2*(a + b*Log[c*x])*
Log[1 + (d*x)/e] + 4*b*d^2*PolyLog[2, -((d*x)/e)])/e^3
```

3.344.3 Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 107, normalized size of antiderivative = 0.88, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {2005, 2780, 2741, 2780, 2741, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx)}{x^4\left(d+\frac{e}{x}\right)}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{a+b\log(cx)}{x^3(dx+e)}dx$$

$$\Big\downarrow \text{2780}$$

$$\frac{\int \frac{a+b\log(cx)}{x^3}dx}{e}-\frac{d\int \frac{a+b\log(cx)}{x^2(e+dx)}dx}{e}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx)}{2x^2}-\frac{b}{4x^2}}{e}-\frac{d\int \frac{a+b\log(cx)}{x^2(e+dx)}dx}{e}$$

$$\Big\downarrow \text{2780}$$

$$\frac{-\frac{a+b\log(cx)}{2x^2}-\frac{b}{4x^2}}{e}-\frac{d\left(\frac{\int \frac{a+b\log(cx)}{x^2}dx}{e}-\frac{d\int \frac{a+b\log(cx)}{x(e+dx)}dx}{e}\right)}{e}$$

$$\Big\downarrow \text{2741}$$

$$\frac{-\frac{a+b\log(cx)}{2x^2}-\frac{b}{4x^2}}{e}-\frac{d\left(\frac{-\frac{a+b\log(cx)}{x}-\frac{b}{x}}{e}-\frac{d\int \frac{a+b\log(cx)}{x(e+dx)}dx}{e}\right)}{e}$$

$$\Big\downarrow \text{2779}$$

$$\frac{-\frac{a+b\log(cx)}{2x^2}-\frac{b}{4x^2}}{e}-\frac{d\left(\frac{-\frac{a+b\log(cx)}{x}-\frac{b}{x}}{e}-\frac{d\left(\frac{b\int\frac{\log\left(\frac{e}{dx}+1\right)}{x}dx}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx))}{e}\right)}{e}\right)}{e}$$

$\downarrow$ 2838

$$\frac{-\frac{a+b\log(cx)}{2x^2}-\frac{b}{4x^2}}{e}-\frac{d\left(\frac{-\frac{a+b\log(cx)}{x}-\frac{b}{x}}{e}-\frac{d\left(\frac{b\,\text{PolyLog}\left(2,-\frac{e}{dx}\right)}{e}-\frac{\log\left(\frac{e}{dx}+1\right)(a+b\log(cx))}{e}\right)}{e}\right)}{e}$$

input
```
Int[(a + b*Log[c*x])/((d + e/x)*x^4),x]
```

output
```
(-1/4*b/x^2 - (a + b*Log[c*x])/(2*x^2))/e - (d*((-(b/x) - (a + b*Log[c*x])
/x)/e - (d*(-((Log[1 + e/(d*x)]*(a + b*Log[c*x]))/e) + (b*PolyLog[2, -(e/(
d*x))])/e))/e))/e
```

3.344.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2780
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(x_)^(m_.))/((d_) + (e_.)*
(x_)^(r_.)), x_Symbol] :> Simp[1/d   Int[x^m*(a + b*Log[c*x^n])^p, x], x] -
 Simp[e/d   Int[(x^(m + r)*(a + b*Log[c*x^n])^p)/(d + e*x^r), x], x] /; Fre
eQ[{a, b, c, d, e, m, n, r}, x] && IGtQ[p, 0] && IGtQ[r, 0] && ILtQ[m, -1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.344.4 Maple [A] (verified)

Time = 0.06 (sec) , antiderivative size = 157, normalized size of antiderivative = 1.30

method	result
parts	$a\left(-\frac{d^2\ln(dx+e)}{e^3}-\frac{1}{2e\,x^2}+\frac{d^2\ln(x)}{e^3}+\frac{d}{e^2x}\right)-\frac{b\,d^2\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{e^3}-\frac{b\,d^2\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{e^3}+\frac{bd\ln(xc)}{e^2x}+$
risch	$-\frac{a\,d^2\ln(dx+e)}{e^3}-\frac{a}{2e\,x^2}+\frac{a\,d^2\ln(x)}{e^3}+\frac{ad}{e^2x}-\frac{b\,d^2\,\mathrm{dilog}\left(\frac{cdx+ce}{ec}\right)}{e^3}-\frac{b\,d^2\ln(xc)\ln\left(\frac{cdx+ce}{ec}\right)}{e^3}+\frac{bd\ln(xc)}{e^2x}+$
derivativedivides	$c^3\left(a\left(-\frac{1}{2e\,c^3x^2}+\frac{d^2\ln(xc)}{e^3c^3}+\frac{d}{e^2c^3x}-\frac{d^2\ln(cdx+ce)}{e^3c^3}\right)+b\left(\frac{-\frac{\ln(xc)}{2x^2c^2}-\frac{1}{4x^2c^2}}{ec}+\frac{d^2\ln(xc)^2}{2e^3c^3}-\frac{d\left(-\frac{\ln(xc)}{xc}\right.}{e^2c^2}\right.\right.$
default	$c^3\left(a\left(-\frac{1}{2e\,c^3x^2}+\frac{d^2\ln(xc)}{e^3c^3}+\frac{d}{e^2c^3x}-\frac{d^2\ln(cdx+ce)}{e^3c^3}\right)+b\left(\frac{-\frac{\ln(xc)}{2x^2c^2}-\frac{1}{4x^2c^2}}{ec}+\frac{d^2\ln(xc)^2}{2e^3c^3}-\frac{d\left(-\frac{\ln(xc)}{xc}\right.}{e^2c^2}\right.\right.$

input
```
int((a+b*ln(x*c))/(d+e/x)/x^4,x,method=_RETURNVERBOSE)
```

output
```
a*(-d^2/e^3*ln(d*x+e)-1/2/e/x^2+d^2/e^3*ln(x)+d/e^2/x)-b/e^3*d^2*dilog((c*
d*x+c*e)/e/c)-b/e^3*d^2*ln(x*c)*ln((c*d*x+c*e)/e/c)+b/e^2*d*ln(x*c)/x+b*d/
e^2/x+1/2*b/e^3*d^2*ln(x*c)^2-1/2*b/e*ln(x*c)/x^2-1/4*b/e/x^2
```

3.344.5 Fricas [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx=\int \frac{b\log\left(cx\right)+a}{\left(d+\frac{e}{x}\right)x^4}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^4,x, algorithm="fricas")
```

output
```
integral((b*log(c*x) + a)/(d*x^4 + e*x^3), x)
```

3.344.6 Sympy [A] (verification not implemented)

Time = 42.65 (sec) , antiderivative size = 252, normalized size of antiderivative = 2.08

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx = -\frac{ad^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)}{e^3} + \frac{ad^2\log(x)}{e^3} + \frac{ad}{e^2x} - \frac{a}{2ex^2} + \frac{bd^3\left(\begin{cases}\frac{x}{e} \\ \frac{\begin{cases}-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1\\ \log(e)\log(x)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } |x|<1\\ -\log(e)\log\left(\frac{1}{x}\right)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(e)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(e)-\operatorname{Li}_2\left(\frac{dxe^{i\pi}}{e}\right) & \text{otherwise}\end{cases}}{d}\end{cases}\right)}{e^3} - \frac{bd^3\left(\begin{cases}\frac{x}{e} & \text{for } d=0\\ \frac{\log(dx+e)}{d} & \text{otherwise}\end{cases}\right)\log(cx)}{e^3} - \frac{bd^2\log(x)^2}{2e^3} + \frac{bd^2\log(x)\log(cx)}{e^3} + \frac{bd\log(cx)}{e^2x} + \frac{bd}{e^2x} - \frac{b\log(cx)}{2ex^2} - \frac{b}{4ex^2}$$

input
```
integrate((a+b*ln(c*x))/(d+e/x)/x**4,x)
```

output
```
-a*d**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))/e**3 + a*d**2*l
og(x)/e**3 + a*d/(e**2*x) - a/(2*e*x**2) + b*d**3*Piecewise((x/e, Eq(d, 0)
), (Piecewise((-polylog(2, d*x*exp_polar(I*pi)/e), (Abs(x) < 1) & (1/Abs(x
) < 1)), (log(e)*log(x) - polylog(2, d*x*exp_polar(I*pi)/e), Abs(x) < 1),
(-log(e)*log(1/x) - polylog(2, d*x*exp_polar(I*pi)/e), 1/Abs(x) < 1), (-me
ijerg(((), (1, 1)), ((0, 0), ()), x)*log(e) + meijerg(((1, 1), ()), ((), (
0, 0)), x)*log(e) - polylog(2, d*x*exp_polar(I*pi)/e), True))/d, True))/e*
*3 - b*d**3*Piecewise((x/e, Eq(d, 0)), (log(d*x + e)/d, True))*log(c*x)/e*
*3 - b*d**2*log(x)**2/(2*e**3) + b*d**2*log(x)*log(c*x)/e**3 + b*d*log(c*x
)/(e**2*x) + b*d/(e**2*x) - b*log(c*x)/(2*e*x**2) - b/(4*e*x**2)
```

3.344.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 151, normalized size of antiderivative = 1.25

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx = -\frac{\left(\log\left(\frac{dx}{e}+1\right)\log\left(x\right)+\mathrm{Li}_2\left(-\frac{dx}{e}\right)\right)bd^2}{e^3} - \frac{\left(bd^2\log\left(c\right)+ad^2\right)\log\left(dx+e\right)}{e^3} + \frac{2\,bd^2x^2\log\left(x\right)^2-2\,ae^2-\left(2\,e^2\log\left(c\right)+e^2\right)b+4\left(ade+\left(de\log\left(c\right)+de\right)b\right)x+2\left(2\,bdex-be^2+2\left(bd^2\,\mathrm{l}\right.\right.}{4\,e^3x^2}$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^4,x, algorithm="maxima")
```

output
```
-(log(d*x/e + 1)*log(x) + dilog(-d*x/e))*b*d^2/e^3 - (b*d^2*log(c) + a*d^2
)*log(d*x + e)/e^3 + 1/4*(2*b*d^2*x^2*log(x)^2 - 2*a*e^2 - (2*e^2*log(c) +
 e^2)*b + 4*(a*d*e + (d*e*log(c) + d*e)*b)*x + 2*(2*b*d*e*x - b*e^2 + 2*(b
*d^2*log(c) + a*d^2)*x^2)*log(x))/(e^3*x^2)
```

3.344.8 Giac [F]

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx = \int \frac{b\log\left(cx\right)+a}{\left(d+\frac{e}{x}\right)x^4}\,dx$$

input
```
integrate((a+b*log(c*x))/(d+e/x)/x^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x) + a)/((d + e/x)*x^4), x)
```

3.344.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx)}{\left(d+\frac{e}{x}\right)x^4}\,dx = \int \frac{a+b\,\ln\left(c\,x\right)}{x^4\,\left(d+\frac{e}{x}\right)}\,dx$$

input
```
int((a + b*log(c*x))/(x^4*(d + e/x)),x)
```

output
```
int((a + b*log(c*x))/(x^4*(d + e/x)), x)
```

3.345 $\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx$

3.345.1 Optimal result

Integrand size = 22, antiderivative size = 17

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx=\frac{\text{PolyLog}(2,1-ex^n)}{en}$$

output
```
polylog(2,1-e*x^n)/e/n
```

3.345.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx=\frac{\text{PolyLog}(2,1-ex^n)}{en}$$

input
```
Integrate[(x^(-1 + n)*Log[e*x^n])/(1 - e*x^n),x]
```

output
```
PolyLog[2, 1 - e*x^n]/(e*n)
```

3.345.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.091, Rules used = {2774, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^{n-1}\log(ex^n)}{1-ex^n}dx$$
$$\Big\downarrow \text{2774}$$
$$\frac{\int \frac{\log(ex^n)}{1-ex^n}dx^n}{n}$$
$$\Big\downarrow \text{2752}$$
$$\frac{\text{PolyLog}(2,1-ex^n)}{en}$$

input
```
Int[(x^(-1 + n)*Log[e*x^n])/(1 - e*x^n),x]
```

output
```
PolyLog[2, 1 - e*x^n]/(e*n)
```

3.345.3.1 Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

3.345.4 Maple [A] (verified)

Time = 0.79 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

method	result
default	$\frac{\text{dilog}(e\,x^n)}{en}$
risch	$-\frac{\ln(1-e\,x^n)\ln(x^n)}{ne}+\frac{\ln(1-e\,x^n)\ln(e\,x^n)}{ne}+\frac{\text{dilog}(e\,x^n)}{en}+\frac{\left(-\frac{i\pi\ \text{csgn}(ie)\,\text{csgn}(ie\,x^n)^2}{2}+\frac{i\pi\ \text{csgn}(ie)\,\text{csgn}(ie\,x^n)\,\text{csgn}(ix^n)}{2}+\frac{i\pi\ \text{csgn}}{}\right.}{ne}$
meijerg	$\frac{i(-1)^{\frac{\text{csgn}(ie)}{2}-\frac{\text{csgn}(ix^n)}{2}-\frac{\text{csgn}(ix^n)\,\text{csgn}(ie)}{2}-\frac{1}{n}-\frac{n-1}{n}}\ln(e)\ln\left(1+ix^n e(-1)^{-\frac{\text{csgn}(ie)}{2}+\frac{\text{csgn}(ix^n)}{2}+\frac{\text{csgn}(ix^n)\,\text{csgn}(ie)}{2}}\right)}{en}-\frac{i(-1)^{\frac{\text{csgn}(}{2}}}{}$

input
```
int(x^(n-1)*ln(e*x^n)/(1-e*x^n),x,method=_RETURNVERBOSE)
```

output
```
1/e/n*dilog(e*x^n)
```

3.345.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 39 vs. 2(16) = 32.

Time = 0.30 (sec) , antiderivative size = 39, normalized size of antiderivative = 2.29

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx = -\frac{n\log(-ex^n+1)\log(x)+\log(ex^n-1)\log(e)+\text{Li}_2(ex^n)}{en}$$

input
```
integrate(x^(-1+n)*log(e*x^n)/(1-e*x^n),x, algorithm="fricas")
```

output
```
-(n*log(-e*x^n + 1)*log(x) + log(e*x^n - 1)*log(e) + dilog(e*x^n))/(e*n)
```

3.345.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(x**(-1+n)*ln(e*x**n)/(1-e*x**n),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

3.345.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 52 vs. $2(16) = 32$.

Time = 0.30 (sec) , antiderivative size = 52, normalized size of antiderivative = 3.06

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx = -\frac{\log(e)\log\left(\frac{ex^n-1}{e}\right)}{en} - \frac{\log(-ex^n+1)\log(x^n)+\mathrm{Li}_2(ex^n)}{en}$$

input
```
integrate(x^(-1+n)*log(e*x^n)/(1-e*x^n),x, algorithm="maxima")
```

output
```
-log(e)*log((e*x^n - 1)/e)/(e*n) - (log(-e*x^n + 1)*log(x^n) + dilog(e*x^n
))/(e*n)
```

3.345.8 Giac [F]

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx = \int -\frac{x^{n-1}\log(ex^n)}{ex^n-1}\,dx$$

input
```
integrate(x^(-1+n)*log(e*x^n)/(1-e*x^n),x, algorithm="giac")
```

output
```
integrate(-x^(n - 1)*log(e*x^n)/(e*x^n - 1), x)
```

3.345.9 Mupad [B] (verification not implemented)

Time = 0.49 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.76

$$\int \frac{x^{-1+n}\log(ex^n)}{1-ex^n}\,dx = \frac{\mathrm{Li}_2(e\,x^n)}{e\,n}$$

input
```
int(-(x^(n - 1)*log(e*x^n))/(e*x^n - 1),x)
```

output
```
dilog(e*x^n)/(e*n)
```

3.346 $\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx$

3.346.1 Optimal result

Integrand size = 23, antiderivative size = 16

$$\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx = \frac{\text{PolyLog}\left(2,1-\frac{x^n}{d}\right)}{n}$$

output
```
polylog(2,1-x^n/d)/n
```

3.346.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

$$\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx = \frac{\text{PolyLog}\left(2,\frac{d-x^n}{d}\right)}{n}$$

input
```
Integrate[(x^(-1 + n)*Log[x^n/d])/(d - x^n),x]
```

output
```
PolyLog[2, (d - x^n)/d]/n
```

3.346.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2774, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^{n-1}\log\left(\frac{x^n}{d}\right)}{d-x^n}dx$$

$$\Big\downarrow \text{2774}$$

$$\frac{\int \frac{\log\left(\frac{x^n}{d}\right)}{d-x^n}dx^n}{n}$$

$$\Big\downarrow \text{2752}$$

$$\frac{\text{PolyLog}\left(2,1-\frac{x^n}{d}\right)}{n}$$

input
```
Int[(x^(-1 + n)*Log[x^n/d])/(d - x^n),x]
```

output
```
PolyLog[2, 1 - x^n/d]/n
```

3.346.3.1 Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

3.346.4 Maple [A] (verified)

Time = 0.48 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.81

method	result
default	$\frac{\operatorname{dilog}\left(\frac{x^n}{d}\right)}{n}$
risch	$-\frac{\ln(x^n)\ln\left(-\frac{-d+x^n}{d}\right)}{n}-\frac{\operatorname{dilog}\left(-\frac{-d+x^n}{d}\right)}{n}+\frac{\left(-\frac{i\pi\ \operatorname{csgn}\left(\frac{i}{d}\right)\operatorname{csgn}\left(\frac{ix^n}{d}\right)^2}{2}+\frac{i\pi\ \operatorname{csgn}\left(\frac{i}{d}\right)\operatorname{csgn}\left(\frac{ix^n}{d}\right)\operatorname{csgn}(ix^n)}{2}+\frac{i\pi\operatorname{csgn}\left(\frac{ix^n}{d}\right)^3}{2}-\frac{i\pi\ \operatorname{cs}}{}\right.}{n}$

input
```
int(x^(n-1)*ln(x^n/d)/(d-x^n),x,method=_RETURNVERBOSE)
```

output
```
1/n*dilog(x^n/d)
```

3.346.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 50 vs. 2(15) = 30.

Time = 0.30 (sec) , antiderivative size = 50, normalized size of antiderivative = 3.12

$$\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx=-\frac{n\log(x)\log\left(\frac{d-x^n}{d}\right)+\log(-d+x^n)\log\left(\frac{1}{d}\right)+\operatorname{Li}_2\left(-\frac{d-x^n}{d}+1\right)}{n}$$

input
```
integrate(x^(-1+n)*log(x^n/d)/(d-x^n),x, algorithm="fricas")
```

output
```
-(n*log(x)*log((d - x^n)/d) + log(-d + x^n)*log(1/d) + dilog(-(d - x^n)/d
+ 1))/n
```

3.346.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx=\text{Exception raised: TypeError}$$

input
```
integrate(x**(-1+n)*ln(x**n/d)/(d-x**n),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

3.346.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 45 vs. $2(15) = 30$.

Time = 0.30 (sec) , antiderivative size = 45, normalized size of antiderivative = 2.81

$$\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx = \frac{\log(d)\log(-d+x^n)}{n} - \frac{\log(x^n)\log\left(-\frac{x^n}{d}+1\right)+\text{Li}_2\left(\frac{x^n}{d}\right)}{n}$$

input
```
integrate(x^(-1+n)*log(x^n/d)/(d-x^n),x, algorithm="maxima")
```

output
```
log(d)*log(-d + x^n)/n - (log(x^n)*log(-x^n/d + 1) + dilog(x^n/d))/n
```

3.346.8 Giac [F]

$$\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx = \int \frac{x^{n-1}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx$$

input
```
integrate(x^(-1+n)*log(x^n/d)/(d-x^n),x, algorithm="giac")
```

output
```
integrate(x^(n - 1)*log(x^n/d)/(d - x^n), x)
```

3.346.9 Mupad [B] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.75

$$\int \frac{x^{-1+n}\log\left(\frac{x^n}{d}\right)}{d-x^n}\,dx = \frac{\text{Li}_2\left(\frac{x^n}{d}\right)}{n}$$

input
```
int((x^(n - 1)*log(x^n/d))/(d - x^n),x)
```

output
```
dilog(x^n/d)/n
```

3.347 $\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx$

3.347.1 Optimal result

Integrand size = 25, antiderivative size = 20

$$\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx = -\frac{\text{PolyLog}\left(2,1+\frac{ex^n}{d}\right)}{en}$$

output
```
-polylog(2,1+e*x^n/d)/e/n
```

3.347.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.05

$$\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx = -\frac{\text{PolyLog}\left(2,\frac{d+ex^n}{d}\right)}{en}$$

input
```
Integrate[(x^(-1 + n)*Log[-((e*x^n)/d)])/(d + e*x^n),x]
```

output
```
-(PolyLog[2, (d + e*x^n)/d]/(e*n))
```

3.347.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2774, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^{n-1}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}dx$$

$$\Big\downarrow \; 2774$$

$$\frac{\int \frac{\log\left(-\frac{ex^n}{d}\right)}{ex^n+d}dx^n}{n}$$

$$\Big\downarrow \; 2752$$

$$-\frac{\text{PolyLog}\left(2,\frac{ex^n}{d}+1\right)}{en}$$

input
```
Int[(x^(-1 + n)*Log[-((e*x^n)/d)])/(d + e*x^n),x]
```

output
```
-(PolyLog[2, 1 + (e*x^n)/d]/(e*n))
```

3.347.3.1 Defintions of rubi rules used

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

3.347.4 Maple [A] (verified)

Time = 0.51 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

method	result
default	$-\frac{\operatorname{dilog}\left(-\frac{e\,x^{n}}{d}\right)}{ne}$
risch	$\frac{\operatorname{dilog}\left(\frac{d+e\,x^{n}}{d}\right)}{ne}+\frac{\ln\left(x^{n}\right)\ln\left(\frac{d+e\,x^{n}}{d}\right)}{ne}+\frac{\left(\frac{i\pi\ \operatorname{csgn}(ie)\operatorname{csgn}(ie\,x^{n})^{2}}{2}-\frac{i\pi\ \operatorname{csgn}(ie)\operatorname{csgn}(ie\,x^{n})\operatorname{csgn}(ix^{n})}{2}-\frac{i\pi\operatorname{csgn}(ie\,x^{n})^{3}}{2}+\frac{i\pi\operatorname{csgn}(ie\,x^{n})^{2}}{2}\right.}{}$

input
```
int(x^(n-1)*ln(-e*x^n/d)/(d+e*x^n),x,method=_RETURNVERBOSE)
```

output
```
-1/n/e*dilog(-e*x^n/d)
```

3.347.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 55 vs. 2(19) = 38.

Time = 0.30 (sec) , antiderivative size = 55, normalized size of antiderivative = 2.75

$$\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx = \frac{n\log(x)\log\left(\frac{ex^n+d}{d}\right)+\log(ex^n+d)\log\left(-\frac{e}{d}\right)+\operatorname{Li}_2\left(-\frac{ex^n+d}{d}+1\right)}{en}$$

input
```
integrate(x^(-1+n)*log(-e*x^n/d)/(d+e*x^n),x, algorithm="fricas")
```

output
```
(n*log(x)*log((e*x^n + d)/d) + log(e*x^n + d)*log(-e/d) + dilog(-(e*x^n +
d)/d + 1))/(e*n)
```

3.347.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate(x**(-1+n)*ln(-e*x**n/d)/(d+e*x**n),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

3.347.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 64 vs. $2(19) = 38$.

Time = 0.31 (sec) , antiderivative size = 64, normalized size of antiderivative = 3.20

$$\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx = -\frac{(\log(d)-\log(e))\log\left(\frac{ex^n+d}{e}\right)}{en} + \frac{\log\left(\frac{ex^n}{d}+1\right)\log(-x^n)+\mathrm{Li}_2\left(-\frac{ex^n}{d}\right)}{en}$$

input
```
integrate(x^(-1+n)*log(-e*x^n/d)/(d+e*x^n),x, algorithm="maxima")
```

output
```
-(log(d) - log(e))*log((e*x^n + d)/e)/(e*n) + (log(e*x^n/d + 1)*log(-x^n)
+ dilog(-e*x^n/d))/(e*n)
```

3.347.8 Giac [F]

$$\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx = \int \frac{x^{n-1}\log\left(-\frac{ex^n}{d}\right)}{ex^n+d}\,dx$$

input
```
integrate(x^(-1+n)*log(-e*x^n/d)/(d+e*x^n),x, algorithm="giac")
```

output
```
integrate(x^(n - 1)*log(-e*x^n/d)/(e*x^n + d), x)
```

3.347.9 Mupad [B] (verification not implemented)

Time = 0.41 (sec) , antiderivative size = 18, normalized size of antiderivative = 0.90

$$\int \frac{x^{-1+n}\log\left(-\frac{ex^n}{d}\right)}{d+ex^n}\,dx = -\frac{\mathrm{Li}_2\left(-\frac{e\,x^n}{d}\right)}{e\,n}$$

input
```
int((x^(n - 1)*log(-(e*x^n)/d))/(d + e*x^n),x)
```

output
```
-dilog(-(e*x^n)/d)/(e*n)
```

3.348 $\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}\,dx$

3.348.1 Optimal result

Integrand size = 18, antiderivative size = 14

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}\,dx = \frac{\operatorname{PolyLog}\left(2,1-\frac{a}{x}\right)}{a}$$

output
```
polylog(2,1-a/x)/a
```

3.348.2 Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.14

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}\,dx = \frac{\operatorname{PolyLog}\left(2,-\frac{a-x}{x}\right)}{a}$$

input
```
Integrate[Log[a/x]/(a*x - x^2),x]
```

output
```
PolyLog[2, -((a - x)/x)]/a
```

3.348.3 Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222, Rules used = {2026, 2778, 2005, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}dx$$
$$\Big\downarrow \text{2026}$$
$$\int \frac{\log\left(\frac{a}{x}\right)}{x(a-x)}dx$$
$$\Big\downarrow \text{2778}$$
$$-\int \frac{x\log\left(\frac{a}{x}\right)}{a-x}d\frac{1}{x}$$
$$\Big\downarrow \text{2005}$$
$$-\int \frac{\log\left(\frac{a}{x}\right)}{\frac{a}{x}-1}d\frac{1}{x}$$
$$\Big\downarrow \text{2752}$$
$$\frac{\text{PolyLog}\left(2,1-\frac{a}{x}\right)}{a}$$

input
```
Int[Log[a/x]/(a*x - x^2),x]
```

output
```
PolyLog[2, 1 - a/x]/a
```

3.348.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2778
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))/((x_)*((d_) + (e_.)*(x_)^(r_.))),
x_Symbol] :> Simp[1/n   Subst[Int[(a + b*Log[c*x])/(x*(d + e*x^(r/n))), x],
 x, x^n], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IntegerQ[r/n]
```

3.348.4 Maple [A] (verified)

Time = 0.78 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.79

method	result	size
derivativedivides	$\frac{\operatorname{dilog}\left(\frac{a}{x}\right)}{a}$	11
default	$\frac{\operatorname{dilog}\left(\frac{a}{x}\right)}{a}$	11
risch	$\frac{\operatorname{dilog}\left(\frac{a}{x}\right)}{a}$	11
parts	$\frac{\ln\left(\frac{a}{x}\right)\ln(x)}{a}-\frac{\ln\left(\frac{a}{x}\right)\ln(a-x)}{a}+\frac{\ln(x)^2}{2a}-\frac{\ln(a-x)\ln\left(\frac{x}{a}\right)}{a}-\frac{\operatorname{dilog}\left(\frac{x}{a}\right)}{a}$	68

input
```
int(ln(a/x)/(a*x-x^2),x,method=_RETURNVERBOSE)
```

output
```
1/a*dilog(a/x)
```

3.348.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 13, normalized size of antiderivative = 0.93

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}\,dx=\frac{\operatorname{Li}_2\left(-\frac{a}{x}+1\right)}{a}$$

input
```
integrate(log(a/x)/(a*x-x^2),x, algorithm="fricas")
```

output
```
dilog(-a/x + 1)/a
```

3.348.6 Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 4.88 (sec) , antiderivative size = 82, normalized size of antiderivative = 5.86

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}\,dx = -\left(\begin{cases} -\frac{1}{x} & \text{for } a=0 \\ \frac{\log\left(\frac{a}{x}-1\right)}{a} & \text{otherwise} \end{cases}\right)\log\left(\frac{a}{x}\right) - \begin{cases} \frac{1}{x} & \text{for } a=0 \\ \frac{\begin{cases} \operatorname{Li}_2\left(\frac{a}{x}\right) & \text{for } \frac{1}{|x|}<1 \wedge |x|<1 \\ i\pi\log(x)+\operatorname{Li}_2\left(\frac{a}{x}\right) & \text{for } |x|<1 \\ -i\pi\log\left(\frac{1}{x}\right)+\operatorname{Li}_2\left(\frac{a}{x}\right) & \text{for } \frac{1}{|x|}<1 \\ -i\pi G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right)+i\pi G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right)+\operatorname{Li}_2\left(\frac{a}{x}\right) & \text{otherwise} \end{cases}}{a} & \text{otherwise} \end{cases}$$

input
```
integrate(ln(a/x)/(a*x-x**2),x)
```

output
```
-Piecewise((-1/x, Eq(a, 0)), (log(a/x - 1)/a, True))*log(a/x) - Piecewise(
(1/x, Eq(a, 0)), (Piecewise((polylog(2, a/x), (Abs(x) < 1) & (1/Abs(x) < 1
)), (I*pi*log(x) + polylog(2, a/x), Abs(x) < 1), (-I*pi*log(1/x) + polylog
(2, a/x), 1/Abs(x) < 1), (-I*pi*meijerg(((), (1, 1)), ((0, 0), ()), x) + I
*pi*meijerg(((1, 1), ()), ((), (0, 0)), x) + polylog(2, a/x), True))/a, Tr
ue))
```

3.348.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 72 vs. $2(13) = 26$.

Time = 0.19 (sec) , antiderivative size = 72, normalized size of antiderivative = 5.14

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax-x^2}\,dx = -\left(\frac{\log(-a+x)}{a}-\frac{\log(x)}{a}\right)\log\left(\frac{a}{x}\right) - \frac{2\log(-a+x)\log(x)-\log(x)^2}{2a} + \frac{\log(x)\log\left(-\frac{x}{a}+1\right)+\operatorname{Li}_2\left(\frac{x}{a}\right)}{a}$$

input
```
integrate(log(a/x)/(a*x-x^2),x, algorithm="maxima")
```

output
```
-(log(-a + x)/a - log(x)/a)*log(a/x) - 1/2*(2*log(-a + x)*log(x) - log(x)^
2)/a + (log(x)*log(-x/a + 1) + dilog(x/a))/a
```

3.348.8 Giac [F]

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax - x^2}\,dx = \int \frac{\log\left(\frac{a}{x}\right)}{ax - x^2}\,dx$$

input
```
integrate(log(a/x)/(a*x-x^2),x, algorithm="giac")
```

output
```
integrate(log(a/x)/(a*x - x^2), x)
```

3.348.9 Mupad [B] (verification not implemented)

Time = 0.38 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.71

$$\int \frac{\log\left(\frac{a}{x}\right)}{ax - x^2}\,dx = \frac{\mathrm{Li}_2\left(\frac{a}{x}\right)}{a}$$

input
```
int(log(a/x)/(a*x - x^2),x)
```

output
```
dilog(a/x)/a
```

3.349 $\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx$

3.349.1 Optimal result

Integrand size = 18, antiderivative size = 17

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx = \frac{\text{PolyLog}\left(2,1-\frac{a}{x^2}\right)}{2a}$$

output
```
1/2*polylog(2,1-a/x^2)/a
```

3.349.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.24

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx = \frac{\text{PolyLog}\left(2,-\frac{a-x^2}{x^2}\right)}{2a}$$

input
```
Integrate[Log[a/x^2]/(a*x - x^3),x]
```

output
```
PolyLog[2, -((a - x^2)/x^2)]/(2*a)
```

3.349.3 Rubi [A] (verified)

Time = 0.24 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.222, Rules used = {2026, 2778, 2005, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx$$

$$\Big\downarrow \text{2026}$$

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{x\left(a-x^2\right)}dx$$

$$\Big\downarrow \text{2778}$$

$$-\frac{1}{2}\int \frac{x^2\log\left(\frac{a}{x^2}\right)}{a-x^2}d\frac{1}{x^2}$$

$$\Big\downarrow \text{2005}$$

$$-\frac{1}{2}\int \frac{\log\left(\frac{a}{x^2}\right)}{\frac{a}{x^2}-1}d\frac{1}{x^2}$$

$$\Big\downarrow \text{2752}$$

$$\frac{\text{PolyLog}\left(2,1-\frac{a}{x^2}\right)}{2a}$$

input
```
Int[Log[a/x^2]/(a*x - x^3),x]
```

output
```
PolyLog[2, 1 - a/x^2]/(2*a)
```

3.349.3.1 Defintions of rubi rules used

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2026
```
Int[(Fx_.)*(Px_)^(p_.), x_Symbol] :> With[{r = Expon[Px, x, Min]}, Int[x^(p
*r)*ExpandToSum[Px/x^r, x]^p*Fx, x] /; IGtQ[r, 0]] /; PolyQ[Px, x] && Integ
erQ[p] &&  !MonomialQ[Px, x] && (ILtQ[p, 0] ||  !PolyQ[u, x])
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2778
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))/((x_)*((d_) + (e_.)*(x_)^(r_.))),
x_Symbol] :> Simp[1/n   Subst[Int[(a + b*Log[c*x])/(x*(d + e*x^(r/n))), x],
 x, x^n], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IntegerQ[r/n]
```

3.349.4 Maple [A] (verified)

Time = 0.67 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.71

method	result
derivativedivides	$\frac{\operatorname{dilog}\left(\frac{a}{x^2}\right)}{2a}$
default	$\frac{\operatorname{dilog}\left(\frac{a}{x^2}\right)}{2a}$
risch	$\frac{\operatorname{dilog}\left(\frac{a}{x^2}\right)}{2a}$
parts	$\frac{\ln\left(\frac{a}{x^2}\right)\ln(x)}{a}-\frac{\ln\left(\frac{a}{x^2}\right)\ln(-x^2+a)}{2a}+\frac{\ln(x)^2}{a}-\frac{\ln(x)\ln(-x^2+a)-\ln(x)\ln\left(\frac{\sqrt{a}-x}{\sqrt{a}}\right)-\ln(x)\ln\left(\frac{\sqrt{a}+x}{\sqrt{a}}\right)-\operatorname{dilog}\left(\frac{\sqrt{a}-}{\sqrt{}}\right.}{a}$

input
```
int(ln(1/x^2*a)/(-x^3+a*x),x,method=_RETURNVERBOSE)
```

output
```
1/2/a*dilog(1/x^2*a)
```

3.349.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 14, normalized size of antiderivative = 0.82

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax - x^3}\,dx = \frac{\text{Li}_2\left(-\frac{a}{x^2} + 1\right)}{2\,a}$$

input
```
integrate(log(a/x^2)/(-x^3+a*x),x, algorithm="fricas")
```

output
```
1/2*dilog(-a/x^2 + 1)/a
```

3.349.6 Sympy [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 5.02 (sec) , antiderivative size = 92, normalized size of antiderivative = 5.41

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax - x^3}\,dx = -\frac{\begin{cases} \frac{\text{Li}_2\left(\frac{a}{x^2}\right)}{2} & \text{for } \frac{1}{|x|} < 1 \wedge |x| < 1 \\ i\pi\log(x) + \frac{\text{Li}_2\left(\frac{a}{x^2}\right)}{2} & \text{for } |x| < 1 \\ -i\pi\log\left(\frac{1}{x}\right) + \frac{\text{Li}_2\left(\frac{a}{x^2}\right)}{2} & \text{for } \frac{1}{|x|} < 1 \\ -i\pi G_{2,2}^{2,0}\left(\begin{matrix} & 1,1 \\ 0,0 & \end{matrix}\middle| x\right) + i\pi G_{2,2}^{0,2}\left(\begin{matrix} 1,1 & \\ & 0,0 \end{matrix}\middle| x\right) + \frac{\text{Li}_2\left(\frac{a}{x^2}\right)}{2} & \text{otherwise} \end{cases}}{a} - \frac{\log\left(\frac{a}{x^2}\right)\log\left(\frac{a}{x^2} - 1\right)}{2a}$$

input
```
integrate(ln(a/x**2)/(-x**3+a*x),x)
```

output
```
-Piecewise((polylog(2, a/x**2)/2, (Abs(x) < 1) & (1/Abs(x) < 1)), (I*pi*lo
g(x) + polylog(2, a/x**2)/2, Abs(x) < 1), (-I*pi*log(1/x) + polylog(2, a/x
**2)/2, 1/Abs(x) < 1), (-I*pi*meijerg(((), (1, 1)), ((0, 0), ()), x) + I*p
i*meijerg(((1, 1), ()), ((), (0, 0)), x) + polylog(2, a/x**2)/2, True))/a
- log(a/x**2)*log(a/x**2 - 1)/(2*a)
```

3.349.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 81 vs. $2(14) = 28$.

Time = 0.20 (sec) , antiderivative size = 81, normalized size of antiderivative = 4.76

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx = -\frac{1}{2}\left(\frac{\log\left(x^2-a\right)}{a}-\frac{2\log\left(x\right)}{a}\right)\log\left(\frac{a}{x^2}\right) - \frac{\log\left(x^2-a\right)\log\left(x\right)-\log\left(x\right)^2}{a} + \frac{2\log\left(x\right)\log\left(-\frac{x^2}{a}+1\right)+\mathrm{Li}_2\left(\frac{x^2}{a}\right)}{2\,a}$$

input
```
integrate(log(a/x^2)/(-x^3+a*x),x, algorithm="maxima")
```

output
```
-1/2*(log(x^2 - a)/a - 2*log(x)/a)*log(a/x^2) - (log(x^2 - a)*log(x) - log
(x)^2)/a + 1/2*(2*log(x)*log(-x^2/a + 1) + dilog(x^2/a))/a
```

3.349.8 Giac [F]

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx = \int -\frac{\log\left(\frac{a}{x^2}\right)}{x^3-ax}\,dx$$

input
```
integrate(log(a/x^2)/(-x^3+a*x),x, algorithm="giac")
```

output
```
integrate(-log(a/x^2)/(x^3 - a*x), x)
```

3.349.9 Mupad [B] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 11, normalized size of antiderivative = 0.65

$$\int \frac{\log\left(\frac{a}{x^2}\right)}{ax-x^3}\,dx = \frac{\mathrm{Li}_2\left(\frac{a}{x^2}\right)}{2\,a}$$

input
```
int(log(a/x^2)/(a*x - x^3),x)
```

output
```
dilog(a/x^2)/(2*a)
```

3.350 $\int \frac{\log(ax^{1-n})}{ax-x^n}\,dx$

3.350.1 Optimal result

Integrand size = 22, antiderivative size = 26

$$\int \frac{\log(ax^{1-n})}{ax-x^n}\,dx = -\frac{\text{PolyLog}(2,1-ax^{1-n})}{a(1-n)}$$

output
```
-polylog(2,1-a*x^(1-n))/a/(1-n)
```

3.350.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \frac{\log(ax^{1-n})}{ax-x^n}\,dx = \frac{\text{PolyLog}(2,1-ax^{1-n})}{a(-1+n)}$$

input
```
Integrate[Log[a*x^(1 - n)]/(a*x - x^n),x]
```

output
```
PolyLog[2, 1 - a*x^(1 - n)]/(a*(-1 + n))
```

3.350.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.182, Rules used = {2027, 2774, 25, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\log \left(ax^{1-n}\right)}{ax-x^n} \, dx$$

$$\Big\downarrow \; 2027$$

$$\int \frac{x^{-n} \log \left(ax^{1-n}\right)}{ax^{1-n}-1}dx$$

$$\Big\downarrow \; 2774$$

$$\frac{\int -\frac{\log \left(ax^{1-n}\right)}{1-ax^{1-n}}dx^{1-n}}{1-n}$$

$$\Big\downarrow \; 25$$

$$-\frac{\int \frac{\log \left(ax^{1-n}\right)}{1-ax^{1-n}}dx^{1-n}}{1-n}$$

$$\Big\downarrow \; 2752$$

$$-\frac{\text{PolyLog}\left(2,1-ax^{1-n}\right)}{a(1-n)}$$

input
```
Int[Log[a*x^(1 - n)]/(a*x - x^n),x]
```

output
```
-(PolyLog[2, 1 - a*x^(1 - n)]/(a*(1 - n)))
```

3.350.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2027
```
Int[(Fx_.)*((a_.)*(x_)^(r_.) + (b_.)*(x_)^(s_.))^(p_.), x_Symbol] :> Int[x^
(p*r)*(a + b*x^(s - r))^p*Fx, x] /; FreeQ[{a, b, r, s}, x] && IntegerQ[p] &
& PosQ[s - r] &&  !(EqQ[p, 1] && EqQ[u, 1])
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

3.350.4 Maple [F]

$$\int \frac{\ln \left(a\,x^{-n+1}\right)}{ax-x^{n}}dx$$

input
```
int(ln(a*x^(-n+1))/(a*x-x^n),x)
```

output
```
int(ln(a*x^(-n+1))/(a*x-x^n),x)
```

3.350.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 89 vs. $2(22) = 44$.

Time = 0.28 (sec) , antiderivative size = 89, normalized size of antiderivative = 3.42

$$\int \frac{\log \left(ax^{1-n}\right)}{ax-x^n}\,dx = \frac{2\,(n-1)\log \left(a\right)\log \left(x\right)-\left(n^2-2\,n+1\right)\log \left(x\right)^2+2\,(n-1)\log \left(x\right)\log \left(\frac{a-x^{n-1}}{a}\right)-2\,\log \left(a\right)\log \left(-a+x^{n}\right.}{2\,(an-a)}$$

input
```
integrate(log(a*x^(1-n))/(a*x-x^n),x, algorithm="fricas")
```

output
```
1/2*(2*(n - 1)*log(a)*log(x) - (n^2 - 2*n + 1)*log(x)^2 + 2*(n - 1)*log(x)
*log((a - x^(n - 1))/a) - 2*log(a)*log(-a + x^(n - 1)) + 2*dilog(-(a - x^(
n - 1))/a + 1))/(a*n - a)
```

3.350.6 Sympy [F]

$$\int \frac{\log(ax^{1-n})}{ax - x^n}\,dx = \int \frac{\log(ax^{1-n})}{ax - x^n}\,dx$$

input
```
integrate(ln(a*x**(1-n))/(a*x-x**n),x)
```

output
```
Integral(log(a*x**(1 - n))/(a*x - x**n), x)
```

3.350.7 Maxima [F]

$$\int \frac{\log(ax^{1-n})}{ax - x^n}\,dx = \int \frac{\log(ax^{-n+1})}{ax - x^n}\,dx$$

input
```
integrate(log(a*x^(1-n))/(a*x-x^n),x, algorithm="maxima")
```

output
```
integrate(log(a*x^(-n + 1))/(a*x - x^n), x)
```

3.350.8 Giac [F]

$$\int \frac{\log(ax^{1-n})}{ax - x^n}\,dx = \int \frac{\log(ax^{-n+1})}{ax - x^n}\,dx$$

input
```
integrate(log(a*x^(1-n))/(a*x-x^n),x, algorithm="giac")
```

output
```
integrate(log(a*x^(-n + 1))/(a*x - x^n), x)
```

3.350.9 Mupad [F(-1)]

Timed out.

$$\int \frac{\log(ax^{1-n})}{ax - x^n} \, dx = \int \frac{\ln(a\,x^{1-n})}{a\,x - x^n} \, dx$$

input
```
int(log(a*x^(1 - n))/(a*x - x^n),x)
```

output
```
int(log(a*x^(1 - n))/(a*x - x^n), x)
```

3.351 $\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))\,dx$

3.351.1 Optimal result

Integrand size = 27, antiderivative size = 171

$$\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))\,dx = -\frac{bd^3nx(fx)^{-1+m}}{m^2} - \frac{3bd^2enx^{1+m}(fx)^{-1+m}}{4m^2} - \frac{bde^2nx^{1+2m}(fx)^{-1+m}}{3m^2} - \frac{be^3nx^{1+3m}(fx)^{-1+m}}{16m^2} - \frac{bd^4nx^{1-m}(fx)^{-1+m}\log(x)}{4em} + \frac{x^{1-m}(fx)^{-1+m}(d+ex^m)^4(a+b\log(cx^n))}{4em}$$

output
```
-b*d^3*n*x*(f*x)^(-1+m)/m^2-3/4*b*d^2*e*n*x^(1+m)*(f*x)^(-1+m)/m^2-1/3*b*d
*e^2*n*x^(1+2*m)*(f*x)^(-1+m)/m^2-1/16*b*e^3*n*x^(1+3*m)*(f*x)^(-1+m)/m^2-
1/4*b*d^4*n*x^(1-m)*(f*x)^(-1+m)*ln(x)/e/m+1/4*x^(1-m)*(f*x)^(-1+m)*(d+e*x
^m)^4*(a+b*ln(c*x^n))/e/m
```

3.351.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 140, normalized size of antiderivative = 0.82

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))\,dx$$
$$=\frac{(fx)^m\,(12am(4d^3+6d^2ex^m+4de^2x^{2m}+e^3x^{3m})-bn(48d^3+36d^2ex^m+16de^2x^{2m}+3e^3x^{3m})+12bm(4d}{48fm^2}$$

input
```
Integrate[(f*x)^(-1 + m)*(d + e*x^m)^3*(a + b*Log[c*x^n]),x]
```

output
```
((f*x)^m*(12*a*m*(4*d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m)) - b
*n*(48*d^3 + 36*d^2*e*x^m + 16*d*e^2*x^(2*m) + 3*e^3*x^(3*m)) + 12*b*m*(4*
d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m))*Log[c*x^n]))/(48*f*m^2)
```

3.351.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.66, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$, Rules used = {2777, 2776, 798, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1}(d+ex^m)^3(a+b\log(cx^n))\,dx$$
$$\Big\downarrow \text{ 2777}$$
$$x^{1-m}(fx)^{m-1}\int x^{m-1}(ex^m+d)^3(a+b\log(cx^n))dx$$
$$\Big\downarrow \text{ 2776}$$
$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^4(a+b\log(cx^n))}{4em}-\frac{bn\int\frac{(ex^m+d)^4}{x}dx}{4em}\right)$$
$$\Big\downarrow \text{ 798}$$
$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^4(a+b\log(cx^n))}{4em}-\frac{bn\int x^{-m}(ex^m+d)^4dx^m}{4em^2}\right)$$
$$\Big\downarrow \text{ 49}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^4(a+b\log(cx^n))}{4em}-\frac{bn\int\left(d^4x^{-m}+6d^2e^2x^m+4de^3x^{2m}+e^4x^{3m}+4d^3e\right)dx^m}{4em^2}\right)$$

$$\Big\downarrow \text{2009}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^4(a+b\log(cx^n))}{4em}-\frac{bn\left(d^4\log(x^m)+4d^3ex^m+3d^2e^2x^{2m}+\frac{4}{3}de^3x^{3m}+\frac{1}{4}e^4x^{4m}\right)}{4em^2}\right)$$

input
```
Int[(f*x)^(-1 + m)*(d + e*x^m)^3*(a + b*Log[c*x^n]),x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/4*(b*n*(4*d^3*e*x^m + 3*d^2*e^2*x^(2*m) + (4*
d*e^3*x^(3*m))/3 + (e^4*x^(4*m))/4 + d^4*Log[x^m]))/(e*m^2) + ((d + e*x^m)
^4*(a + b*Log[c*x^n]))/(4*e*m))
```

3.351.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

3.351.4 Maple [A] (verified)

Time = 54.99 (sec) , antiderivative size = 256, normalized size of antiderivative = 1.50

method	result
parallelrisch	$-\frac{-12e^3b(fx)^{m-1}\ln(cx^n)x x^{3m}m-12x x^{3m}(fx)^{m-1}a e^3m+3x x^{3m}(fx)^{m-1}b e^3n-48e^2db(fx)^{m-1}\ln(cx^n)x^{2m}xm-48x x^{2}\cdots}{\cdots}$
risch	$\frac{b\left(e^3x^{3m}+4d e^2x^{2m}+6d^2e x^m+4d^3\right)x\, e^{\frac{(m-1)\left(-i\pi \operatorname{csgn}(ifx)^3+i\pi \operatorname{csgn}(ifx)^2 \operatorname{csgn}(if)+i\pi \operatorname{csgn}(ifx)^2 \operatorname{csgn}(ix)-i\pi \operatorname{csgn}(ifx)\operatorname{csgn}(if)\,\mathrm{cs}\cdots\right)}{2}}\cdots}{4m}$

input
```
int((f*x)^(m-1)*(d+e*x^m)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/48*(-12*e^3*b*(f*x)^(m-1)*ln(c*x^n)*x*(x^m)^3*m-12*x*(x^m)^3*(f*x)^(m-1
)*a*e^3*m+3*x*(x^m)^3*(f*x)^(m-1)*b*e^3*n-48*e^2*d*b*(f*x)^(m-1)*ln(c*x^n)
*(x^m)^2*x*m-48*x*(x^m)^2*(f*x)^(m-1)*a*d*e^2*m+16*x*(x^m)^2*(f*x)^(m-1)*b
*d*e^2*n-72*e*d^2*b*(f*x)^(m-1)*ln(c*x^n)*x^m*x*m-72*x*x^m*(f*x)^(m-1)*a*d
^2*e*m+36*x*x^m*(f*x)^(m-1)*b*d^2*e*n-48*b*d^3*(f*x)^(m-1)*ln(c*x^n)*x*m-4
8*x*(f*x)^(m-1)*a*d^3*m+48*x*(f*x)^(m-1)*b*d^3*n)/m^2
```

3.351.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 193, normalized size of antiderivative = 1.13

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))\,dx$$
$$=\frac{3\left(4\,be^3mn\log(x)+4\,be^3m\log(c)+4\,ae^3m-be^3n\right)f^{m-1}x^{4\,m}+16\left(3\,bde^2mn\log(x)+3\,bde^2m\log(c)+\cdots\right.}{\cdots}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/48*(3*(4*b*e^3*m*n*log(x) + 4*b*e^3*m*log(c) + 4*a*e^3*m - b*e^3*n)*f^(m
 - 1)*x^(4*m) + 16*(3*b*d*e^2*m*n*log(x) + 3*b*d*e^2*m*log(c) + 3*a*d*e^2*
m - b*d*e^2*n)*f^(m - 1)*x^(3*m) + 36*(2*b*d^2*e*m*n*log(x) + 2*b*d^2*e*m*
log(c) + 2*a*d^2*e*m - b*d^2*e*n)*f^(m - 1)*x^(2*m) + 48*(b*d^3*m*n*log(x)
 + b*d^3*m*log(c) + a*d^3*m - b*d^3*n)*f^(m - 1)*x^m)/m^2
```

3.351.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 333 vs. $2(160) = 320$.

Time = 8.48 (sec) , antiderivative size = 333, normalized size of antiderivative = 1.95

$$\int (fx)^{-1+m} (d + ex^m)^3 (a + b\log(cx^n)) \, dx$$

$$= \begin{cases} \frac{ad^3x(fx)^{m-1}}{m} + \frac{3ad^2exx^m(fx)^{m-1}}{2m} + \frac{ade^2xx^{2m}(fx)^{m-1}}{m} + \frac{ae^3xx^{3m}(fx)^{m-1}}{4m} + \frac{bd^3x(fx)^{m-1}\log(cx^n)}{m} - \frac{bd^3nx(fx)^{m-1}}{m^2} + \frac{3bd^2 \\ \frac{(d+e)^3\left(\begin{cases} a\log(x) & \text{for } b = 0 \\ -(-a - b\log(c))\log(x) & \text{for } n = 0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right)}{f} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(d+e*x**m)**3*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d**3*x*(f*x)**(m - 1)/m + 3*a*d**2*e*x*x**m*(f*x)**(m - 1)/(2
*m) + a*d*e**2*x*x**(2*m)*(f*x)**(m - 1)/m + a*e**3*x*x**(3*m)*(f*x)**(m -
 1)/(4*m) + b*d**3*x*(f*x)**(m - 1)*log(c*x**n)/m - b*d**3*n*x*(f*x)**(m -
 1)/m**2 + 3*b*d**2*e*x*x**m*(f*x)**(m - 1)*log(c*x**n)/(2*m) - 3*b*d**2*e
*n*x*x**m*(f*x)**(m - 1)/(4*m**2) + b*d*e**2*x*x**(2*m)*(f*x)**(m - 1)*log
(c*x**n)/m - b*d*e**2*n*x*x**(2*m)*(f*x)**(m - 1)/(3*m**2) + b*e**3*x*x**(
3*m)*(f*x)**(m - 1)*log(c*x**n)/(4*m) - b*e**3*n*x*x**(3*m)*(f*x)**(m - 1)
/(16*m**2), Ne(m, 0)), ((d + e)**3*Piecewise((a*log(x), Eq(b, 0)), (-(-a -
 b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))/f,
True))
```

3.351.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 253, normalized size of antiderivative = 1.48

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))\,dx = \frac{be^3f^{m-1}x^{4m}\log(cx^n)}{4m} + \frac{bde^2f^{m-1}x^{3m}\log(cx^n)}{m} + \frac{3bd^2ef^{m-1}x^{2m}\log(cx^n)}{2m} + \frac{ae^3f^{m-1}x^{4m}}{4m} - \frac{be^3f^{m-1}nx^{4m}}{16m^2} + \frac{ade^2f^{m-1}x^{3m}}{m} - \frac{bde^2f^{m-1}nx^{3m}}{3m^2} + \frac{3ad^2ef^{m-1}x^{2m}}{2m} - \frac{3bd^2ef^{m-1}nx^{2m}}{4m^2} - \frac{bd^3f^{m-1}nx^m}{m^2} + \frac{(fx)^m bd^3\log(cx^n)}{fm} + \frac{(fx)^m ad^3}{fm}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
1/4*b*e^3*f^(m - 1)*x^(4*m)*log(c*x^n)/m + b*d*e^2*f^(m - 1)*x^(3*m)*log(c
*x^n)/m + 3/2*b*d^2*e*f^(m - 1)*x^(2*m)*log(c*x^n)/m + 1/4*a*e^3*f^(m - 1)
*x^(4*m)/m - 1/16*b*e^3*f^(m - 1)*n*x^(4*m)/m^2 + a*d*e^2*f^(m - 1)*x^(3*m
)/m - 1/3*b*d*e^2*f^(m - 1)*n*x^(3*m)/m^2 + 3/2*a*d^2*e*f^(m - 1)*x^(2*m)/
m - 3/4*b*d^2*e*f^(m - 1)*n*x^(2*m)/m^2 - b*d^3*f^(m - 1)*n*x^m/m^2 + (f*x
)^m*b*d^3*log(c*x^n)/(f*m) + (f*x)^m*a*d^3/(f*m)
```

3.351.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 339 vs. $2(161) = 322$.

Time = 0.43 (sec) , antiderivative size = 339, normalized size of antiderivative = 1.98

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))\,dx = \frac{be^3f^mnx^{4m}\log(x)}{4fm} + \frac{bde^2f^mnx^{3m}\log(x)}{fm} + \frac{3bd^2ef^mnx^{2m}\log(x)}{2fm} + \frac{bd^3f^mnx^m\log(x)}{fm} + \frac{be^3f^mx^{4m}\log(c)}{4fm} + \frac{bde^2f^mx^{3m}\log(c)}{fm} + \frac{3bd^2ef^mx^{2m}\log(c)}{2fm} + \frac{bd^3f^mx^m\log(c)}{fm} + \frac{ae^3f^mx^{4m}}{4fm} - \frac{be^3f^mnx^{4m}}{16fm^2} + \frac{ade^2f^mx^{3m}}{fm} - \frac{bde^2f^mnx^{3m}}{3fm^2} + \frac{3ad^2ef^mx^{2m}}{2fm} - \frac{3bd^2ef^mnx^{2m}}{4fm^2} + \frac{ad^3f^mx^m}{fm} - \frac{bd^3f^mnx^m}{fm^2}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*b*e^3*f^m*n*x^(4*m)*log(x)/(f*m) + b*d*e^2*f^m*n*x^(3*m)*log(x)/(f*m)
+ 3/2*b*d^2*e*f^m*n*x^(2*m)*log(x)/(f*m) + b*d^3*f^m*n*x^m*log(x)/(f*m) +
1/4*b*e^3*f^m*x^(4*m)*log(c)/(f*m) + b*d*e^2*f^m*x^(3*m)*log(c)/(f*m) + 3/
2*b*d^2*e*f^m*x^(2*m)*log(c)/(f*m) + b*d^3*f^m*x^m*log(c)/(f*m) + 1/4*a*e^
3*f^m*x^(4*m)/(f*m) - 1/16*b*e^3*f^m*n*x^(4*m)/(f*m^2) + a*d*e^2*f^m*x^(3*
m)/(f*m) - 1/3*b*d*e^2*f^m*n*x^(3*m)/(f*m^2) + 3/2*a*d^2*e*f^m*x^(2*m)/(f*
m) - 3/4*b*d^2*e*f^m*n*x^(2*m)/(f*m^2) + a*d^3*f^m*x^m/(f*m) - b*d^3*f^m*n
*x^m/(f*m^2)
```

3.351.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))\,dx = \int (f\,x)^{m-1}\,(d+e\,x^m)^3\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((f*x)^(m - 1)*(d + e*x^m)^3*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^(m - 1)*(d + e*x^m)^3*(a + b*log(c*x^n)), x)
```

3.351. $\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n)) \, dx$

3.352 $\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))\,dx$

3.352.1 Optimal result

Integrand size = 27, antiderivative size = 142

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))\,dx = -\frac{bd^2nx(fx)^{-1+m}}{m^2} - \frac{bdenx^{1+m}(fx)^{-1+m}}{2m^2} - \frac{be^2nx^{1+2m}(fx)^{-1+m}}{9m^2} - \frac{bd^3nx^{1-m}(fx)^{-1+m}\log(x)}{3em} + \frac{x^{1-m}(fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))}{3em}$$

output
```
-b*d^2*n*x*(f*x)^(-1+m)/m^2-1/2*b*d*e*n*x^(1+m)*(f*x)^(-1+m)/m^2-1/9*b*e^2
*n*x^(1+2*m)*(f*x)^(-1+m)/m^2-1/3*b*d^3*n*x^(1-m)*(f*x)^(-1+m)*ln(x)/e/m+1
/3*x^(1-m)*(f*x)^(-1+m)*(d+e*x^m)^3*(a+b*ln(c*x^n))/e/m
```

3.352.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 101, normalized size of antiderivative = 0.71

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))\,dx = \frac{(fx)^m\left(6am(3d^2+3dex^m+e^2x^{2m}) - bn(18d^2+9dex^m+2e^2x^{2m}) + 6bm(3d^2+3dex^m+e^2x^{2m})\log(cx^n\right.}{18fm^2}$$

input
```
Integrate[(f*x)^(-1 + m)*(d + e*x^m)^2*(a + b*Log[c*x^n]),x]
```

output
```
((f*x)^m*(6*a*m*(3*d^2 + 3*d*e*x^m + e^2*x^(2*m)) - b*n*(18*d^2 + 9*d*e*x^
m + 2*e^2*x^(2*m)) + 6*b*m*(3*d^2 + 3*d*e*x^m + e^2*x^(2*m))*Log[c*x^n]))/
(18*f*m^2)
```

3.352.3 Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 100, normalized size of antiderivative = 0.70, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185, Rules used = {2777, 2776, 798, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1} (d+ex^m)^2 (a+b\log(cx^n))\, dx$$

$$\Big\downarrow \text{2777}$$

$$x^{1-m}(fx)^{m-1}\int x^{m-1}(ex^m+d)^2 (a+b\log(cx^n))dx$$

$$\Big\downarrow \text{2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3 (a+b\log(cx^n))}{3em}-\frac{bn\int \frac{(ex^m+d)^3}{x}dx}{3em}\right)$$

$$\Big\downarrow \text{798}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3 (a+b\log(cx^n))}{3em}-\frac{bn\int x^{-m}(ex^m+d)^3\, dx^m}{3em^2}\right)$$

$$\Big\downarrow \text{49}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3 (a+b\log(cx^n))}{3em}-\frac{bn\int \left(d^3x^{-m}+3de^2x^m+e^3x^{2m}+3d^2e\right) dx^m}{3em^2}\right)$$

$$\Big\downarrow \text{2009}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3 (a+b\log(cx^n))}{3em}-\frac{bn\left(d^3\log(x^m)+3d^2ex^m+\frac{3}{2}de^2x^{2m}+\frac{1}{3}e^3x^{3m}\right)}{3em^2}\right)$$

input
```
Int[(f*x)^(-1 + m)*(d + e*x^m)^2*(a + b*Log[c*x^n]),x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/3*(b*n*(3*d^2*e*x^m + (3*d*e^2*x^(2*m))/2 + (
e^3*x^(3*m))/3 + d^3*Log[x^m]))/(e*m^2) + ((d + e*x^m)^3*(a + b*Log[c*x^n]
))/(3*e*m))
```

3.352.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

3.352.4 Maple [A] (verified)

Time = 12.18 (sec) , antiderivative size = 181, normalized size of antiderivative = 1.27

method	result
parallelrisch	$-\frac{-6e^{2}b(fx)^{m-1}\ln(c\,x^{n})x^{2m}xm-6x\,x^{2m}(fx)^{m-1}a\,e^{2}m+2x\,x^{2m}(fx)^{m-1}b\,e^{2}n-18bde(fx)^{m-1}\ln(c\,x^{n})x^{m}xm-18x\,x^{m}(fx \cdots}{18m^{2}}$
risch	$\frac{b\left(e^{2}x^{2m}+3de\,x^{m}+3d^{2}\right)x\,\mathrm{e}^{\frac{(m-1)\left(-i\pi\,\mathrm{csgn}(ifx)^{3}+i\pi\,\mathrm{csgn}(ifx)^{2}\,\mathrm{csgn}(if)+i\pi\,\mathrm{csgn}(ifx)^{2}\,\mathrm{csgn}(ix)-i\pi\,\mathrm{csgn}(ifx)\,\mathrm{csgn}(if)\,\mathrm{csgn}(ix)+2\ln(x \cdots\right.}{2}}}{3m}$

input
```
int((f*x)^(m-1)*(d+e*x^m)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/18*(-6*e^2*b*(f*x)^(m-1)*ln(c*x^n)*(x^m)^2*x*m-6*x*(x^m)^2*(f*x)^(m-1)*
a*e^2*m+2*x*(x^m)^2*(f*x)^(m-1)*b*e^2*n-18*b*d*e*(f*x)^(m-1)*ln(c*x^n)*x^m
*x*m-18*x*x^m*(f*x)^(m-1)*a*d*e*m+9*x*x^m*(f*x)^(m-1)*b*d*e*n-18*b*d^2*(f*
x)^(m-1)*ln(c*x^n)*x*m-18*x*(f*x)^(m-1)*a*d^2*m+18*x*(f*x)^(m-1)*b*d^2*n)/
m^2
```

3.352.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 135, normalized size of antiderivative = 0.95

$$\int (fx)^{-1+m}\left(d+ex^{m}\right)^{2}\left(a+b\log\left(cx^{n}\right)\right)\,dx$$
$$=\frac{2\left(3\,be^{2}mn\log\left(x\right)+3\,be^{2}m\log\left(c\right)+3\,ae^{2}m-be^{2}n\right)f^{m-1}x^{3\,m}+9\left(2\,bdemn\log\left(x\right)+2\,bdem\log\left(c\right)+2\,a \cdots\right.}{18\,m^{2}}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/18*(2*(3*b*e^2*m*n*log(x) + 3*b*e^2*m*log(c) + 3*a*e^2*m - b*e^2*n)*f^(m
 - 1)*x^(3*m) + 9*(2*b*d*e*m*n*log(x) + 2*b*d*e*m*log(c) + 2*a*d*e*m - b*d
*e*n)*f^(m - 1)*x^(2*m) + 18*(b*d^2*m*n*log(x) + b*d^2*m*log(c) + a*d^2*m
- b*d^2*n)*f^(m - 1)*x^m)/m^2
```

3.352.6 Sympy [A] (verification not implemented)

Time = 4.90 (sec) , antiderivative size = 241, normalized size of antiderivative = 1.70

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))\,dx = \begin{cases} \frac{ad^2x(fx)^{m-1}}{m} + \frac{adexx^m(fx)^{m-1}}{m} + \frac{ae^2xx^{2m}(fx)^{m-1}}{3m} + \frac{bd^2x(fx)^{m-1}\log(cx^n)}{m} - \frac{bd^2nx(fx)^{m-1}}{m^2} + \frac{bdexx^m(fx)^{m-1}\log(cx^n)}{m} - \\ \frac{(d+e)^2\left(\begin{cases} a\log(x) & \text{for } b=0 \\ -(-a-b\log(c))\log(x) & \text{for } n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right)}{f} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(d+e*x**m)**2*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d**2*x*(f*x)**(m - 1)/m + a*d*e*x*x**m*(f*x)**(m - 1)/m + a*e
**2*x*x**(2*m)*(f*x)**(m - 1)/(3*m) + b*d**2*x*(f*x)**(m - 1)*log(c*x**n)/
m - b*d**2*n*x*(f*x)**(m - 1)/m**2 + b*d*e*x*x**m*(f*x)**(m - 1)*log(c*x**
n)/m - b*d*e*n*x*x**m*(f*x)**(m - 1)/(2*m**2) + b*e**2*x*x**(2*m)*(f*x)**(
m - 1)*log(c*x**n)/(3*m) - b*e**2*n*x*x**(2*m)*(f*x)**(m - 1)/(9*m**2), Ne
(m, 0)), ((d + e)**2*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log
(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))/f, True))
```

3.352.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 180, normalized size of antiderivative = 1.27

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))\,dx = \frac{be^2f^{m-1}x^{3m}\log(cx^n)}{3m} + \frac{bdef^{m-1}x^{2m}\log(cx^n)}{m} + \frac{ae^2f^{m-1}x^{3m}}{3m} - \frac{be^2f^{m-1}nx^{3m}}{9m^2} + \frac{adef^{m-1}x^{2m}}{m} - \frac{bdef^{m-1}nx^{2m}}{2m^2} - \frac{bd^2f^{m-1}nx^m}{m^2} + \frac{(fx)^m bd^2\log(cx^n)}{fm} + \frac{(fx)^m ad^2}{fm}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
1/3*b*e^2*f^(m - 1)*x^(3*m)*log(c*x^n)/m + b*d*e*f^(m - 1)*x^(2*m)*log(c*x
^n)/m + 1/3*a*e^2*f^(m - 1)*x^(3*m)/m - 1/9*b*e^2*f^(m - 1)*n*x^(3*m)/m^2
+ a*d*e*f^(m - 1)*x^(2*m)/m - 1/2*b*d*e*f^(m - 1)*n*x^(2*m)/m^2 - b*d^2*f^
(m - 1)*n*x^m/m^2 + (f*x)^m*b*d^2*log(c*x^n)/(f*m) + (f*x)^m*a*d^2/(f*m)
```

3.352.8 Giac [A] (verification not implemented)

Time = 0.42 (sec) , antiderivative size = 241, normalized size of antiderivative = 1.70

$$\int (fx)^{-1+m}(d+ex^m)^2(a+b\log(cx^n))\,dx = \frac{be^2f^mnx^{3m}\log(x)}{3fm} + \frac{bdef^mnx^{2m}\log(x)}{fm} + \frac{bd^2f^mnx^m\log(x)}{fm} + \frac{be^2f^mx^{3m}\log(c)}{3fm} + \frac{bdef^mx^{2m}\log(c)}{fm} + \frac{bd^2f^mx^m\log(c)}{fm} + \frac{ae^2f^mx^{3m}}{3fm} - \frac{be^2f^mnx^{3m}}{9fm^2} + \frac{adef^mx^{2m}}{fm} - \frac{bdef^mnx^{2m}}{2fm^2} + \frac{ad^2f^mx^m}{fm} - \frac{bd^2f^mnx^m}{fm^2}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/3*b*e^2*f^m*n*x^(3*m)*log(x)/(f*m) + b*d*e*f^m*n*x^(2*m)*log(x)/(f*m) +
b*d^2*f^m*n*x^m*log(x)/(f*m) + 1/3*b*e^2*f^m*x^(3*m)*log(c)/(f*m) + b*d*e*
f^m*x^(2*m)*log(c)/(f*m) + b*d^2*f^m*x^m*log(c)/(f*m) + 1/3*a*e^2*f^m*x^(3
*m)/(f*m) - 1/9*b*e^2*f^m*n*x^(3*m)/(f*m^2) + a*d*e*f^m*x^(2*m)/(f*m) - 1/
2*b*d*e*f^m*n*x^(2*m)/(f*m^2) + a*d^2*f^m*x^m/(f*m) - b*d^2*f^m*n*x^m/(f*m
^2)
```

3.352.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m}(d+ex^m)^2(a+b\log(cx^n))\,dx = \int (f\,x)^{m-1}\,(d+e\,x^m)^2\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((f*x)^(m - 1)*(d + e*x^m)^2*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^(m - 1)*(d + e*x^m)^2*(a + b*log(c*x^n)), x)
```

3.353 $\int (fx)^{-1+m} (d + ex^m) (a + b\log(cx^n))\,dx$

3.353.1 Optimal result

Integrand size = 25, antiderivative size = 90

$$\int (fx)^{-1+m} (d + ex^m) (a + b\log(cx^n))\,dx = -\frac{bdn(fx)^m}{fm^2} - \frac{benx^m(fx)^m}{4fm^2} + \frac{d(fx)^m (a + b\log(cx^n))}{fm} + \frac{ex^m(fx)^m (a + b\log(cx^n))}{2fm}$$

output
```
-b*d*n*(f*x)^m/f/m^2-1/4*b*e*n*x^m*(f*x)^m/f/m^2+d*(f*x)^m*(a+b*ln(c*x^n))
/f/m+1/2*e*x^m*(f*x)^m*(a+b*ln(c*x^n))/f/m
```

3.353.2 Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 61, normalized size of antiderivative = 0.68

$$\int (fx)^{-1+m} (d + ex^m) (a + b\log(cx^n))\,dx = \frac{(fx)^m (2am(2d + ex^m) - bn(4d + ex^m) + 2bm(2d + ex^m)\log(cx^n))}{4fm^2}$$

input
```
Integrate[(f*x)^(-1 + m)*(d + e*x^m)*(a + b*Log[c*x^n]),x]
```

output
```
((f*x)^m*(2*a*m*(2*d + e*x^m) - b*n*(4*d + e*x^m) + 2*b*m*(2*d + e*x^m)*Lo
g[c*x^n]))/(4*f*m^2)
```

3.353.3 Rubi [A] (verified)

Time = 0.33 (sec) , antiderivative size = 85, normalized size of antiderivative = 0.94, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2777, 2776, 798, 49, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1}(d+ex^m)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2777}$$

$$x^{1-m}(fx)^{m-1}\int x^{m-1}(ex^m+d)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2(a+b\log(cx^n))}{2em}-\frac{bn\int\frac{(ex^m+d)^2}{x}dx}{2em}\right)$$

$$\Big\downarrow \text{798}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2(a+b\log(cx^n))}{2em}-\frac{bn\int x^{-m}(ex^m+d)^2\,dx^m}{2em^2}\right)$$

$$\Big\downarrow \text{49}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2(a+b\log(cx^n))}{2em}-\frac{bn\int(d^2x^{-m}+e^2x^m+2de)\,dx^m}{2em^2}\right)$$

$$\Big\downarrow \text{2009}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2(a+b\log(cx^n))}{2em}-\frac{bn\left(d^2\log(x^m)+2dex^m+\frac{1}{2}e^2x^{2m}\right)}{2em^2}\right)$$

input
```
Int[(f*x)^(-1 + m)*(d + e*x^m)*(a + b*Log[c*x^n]),x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/2*(b*n*(2*d*e*x^m + (e^2*x^(2*m))/2 + d^2*Log
[x^m]))/(e*m^2) + ((d + e*x^m)^2*(a + b*Log[c*x^n]))/(2*e*m))
```

3.353.3.1 Defintions of rubi rules used

rule 49
```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x]
&& IGtQ[m, 0] && IGtQ[m + n + 2, 0]
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

3.353.4 Maple [A] (verified)

Time = 1.74 (sec) , antiderivative size = 105, normalized size of antiderivative = 1.17

method	result
parallelrisch	$-\frac{-2x\,x^{m}\ln\left(c\,x^{n}\right)\left(fx\right)^{m-1}bem-2x\,x^{m}\left(fx\right)^{m-1}aem+x\,x^{m}\left(fx\right)^{m-1}ben-4x\ln\left(c\,x^{n}\right)\left(fx\right)^{m-1}bdm-4x\left(fx\right)^{m-1}adm+4x(fx)}{4m^{2}}$
risch	$\frac{b\left(e\,x^{m}+2d\right)x\,\mathrm{e}^{\frac{\left(m-1\right)\left(-i\pi\,\mathrm{csgn}\left(ifx\right)^{3}+i\pi\,\mathrm{csgn}\left(ifx\right)^{2}\mathrm{csgn}\left(if\right)+i\pi\,\mathrm{csgn}\left(ifx\right)^{2}\mathrm{csgn}\left(ix\right)-i\pi\,\mathrm{csgn}\left(ifx\right)\mathrm{csgn}\left(if\right)\mathrm{csgn}\left(ix\right)+2\ln\left(x\right)+2\ln\left(f\right)\right)}{2}}\ln}{2m}$

input
```
int((f*x)^(m-1)*(d+e*x^m)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-2*x*x^m*ln(c*x^n)*(f*x)^(m-1)*b*e*m-2*x*x^m*(f*x)^(m-1)*a*e*m+x*x^m
*(f*x)^(m-1)*b*e*n-4*x*ln(c*x^n)*(f*x)^(m-1)*b*d*m-4*x*(f*x)^(m-1)*a*d*m+4
*x*(f*x)^(m-1)*b*d*n)/m^2
```

3.353.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 76, normalized size of antiderivative = 0.84

$$\int (fx)^{-1+m}\left(d+ex^m\right)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{\left(2\,bemn\log\left(x\right)+2\,bem\log\left(c\right)+2\,aem-ben\right)f^{m-1}x^{2\,m}+4\left(bdmn\log\left(x\right)+bdm\log\left(c\right)+adm-bdn\right)f^{r}}{4\,m^2}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/4*((2*b*e*m*n*log(x) + 2*b*e*m*log(c) + 2*a*e*m - b*e*n)*f^(m - 1)*x^(2*
m) + 4*(b*d*m*n*log(x) + b*d*m*log(c) + a*d*m - b*d*n)*f^(m - 1)*x^m)/m^2
```

3.353.6 Sympy [A] (verification not implemented)

Time = 3.01 (sec) , antiderivative size = 156, normalized size of antiderivative = 1.73

$$\int (fx)^{-1+m}\left(d+ex^m\right)\left(a+b\log\left(cx^n\right)\right)\,dx = \begin{cases} \frac{adx(fx)^{m-1}}{m}+\frac{aexx^m(fx)^{m-1}}{2m}+\frac{bdx(fx)^{m-1}\log\left(cx^n\right)}{m}-\frac{bdnx(fx)^{m-1}}{m^2}+\frac{bexx^m(fx)^{m-1}\log\left(cx^n\right)}{2m}-\frac{benxx^m(fx)^{m-1}}{4m^2} & \text{for } m \\ \frac{(d+e)\left(\begin{cases} a\log\left(x\right) & \text{for } b=0 \\ -\left(-a-b\log\left(c\right)\right)\log\left(x\right) & \text{for } n=0 \\ \frac{\left(-a-b\log\left(cx^n\right)\right)^2}{2bn} & \text{otherwise} \end{cases}\right)}{f} & \text{other} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(d+e*x**m)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d*x*(f*x)**(m - 1)/m + a*e*x*x**m*(f*x)**(m - 1)/(2*m) + b*d*
x*(f*x)**(m - 1)*log(c*x**n)/m - b*d*n*x*(f*x)**(m - 1)/m**2 + b*e*x*x**m*
(f*x)**(m - 1)*log(c*x**n)/(2*m) - b*e*n*x*x**m*(f*x)**(m - 1)/(4*m**2), N
e(m, 0)), ((d + e)*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x
), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))/f, True))
```

3.353.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.21

$$\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))\,dx = \frac{bef^{m-1}x^{2m}\log(cx^n)}{2m} + \frac{aef^{m-1}x^{2m}}{2m} - \frac{bef^{m-1}nx^{2m}}{4m^2} - \frac{bdf^{m-1}nx^m}{m^2} + \frac{(fx)^m bd\log(cx^n)}{fm} + \frac{(fx)^m ad}{fm}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
1/2*b*e*f^(m - 1)*x^(2*m)*log(c*x^n)/m + 1/2*a*e*f^(m - 1)*x^(2*m)/m - 1/4
*b*e*f^(m - 1)*n*x^(2*m)/m^2 - b*d*f^(m - 1)*n*x^m/m^2 + (f*x)^m*b*d*log(c
*x^n)/(f*m) + (f*x)^m*a*d/(f*m)
```

3.353.8 Giac [A] (verification not implemented)

Time = 0.40 (sec) , antiderivative size = 146, normalized size of antiderivative = 1.62

$$\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))\,dx = \frac{bef^mnx^{2m}\log(x)}{2fm} + \frac{bdf^mnx^m\log(x)}{fm} + \frac{bef^mx^{2m}\log(c)}{2fm} + \frac{bdf^mx^m\log(c)}{fm} + \frac{aef^mx^{2m}}{2fm} - \frac{bef^mnx^{2m}}{4fm^2} + \frac{adf^mx^m}{fm} - \frac{bdf^mnx^m}{fm^2}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/2*b*e*f^m*n*x^(2*m)*log(x)/(f*m) + b*d*f^m*n*x^m*log(x)/(f*m) + 1/2*b*e*
f^m*x^(2*m)*log(c)/(f*m) + b*d*f^m*x^m*log(c)/(f*m) + 1/2*a*e*f^m*x^(2*m)/
(f*m) - 1/4*b*e*f^m*n*x^(2*m)/(f*m^2) + a*d*f^m*x^m/(f*m) - b*d*f^m*n*x^m/
(f*m^2)
```

3.353.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))\,dx=\int (f\,x)^{m-1}\,(d+e\,x^m)\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((f*x)^(m - 1)*(d + e*x^m)*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^(m - 1)*(d + e*x^m)*(a + b*log(c*x^n)), x)
```

3.354 $\int (fx)^{-1+m} (a + b \log (cx^n)) \, dx$

3.354.1 Optimal result

Integrand size = 18, antiderivative size = 38

$$\int (fx)^{-1+m} (a + b \log (cx^n)) \, dx = -\frac{bn(fx)^m}{fm^2} + \frac{(fx)^m (a + b \log (cx^n))}{fm}$$

output
```
-b*n*(f*x)^m/f/m^2+(f*x)^m*(a+b*ln(c*x^n))/f/m
```

3.354.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.76

$$\int (fx)^{-1+m} (a + b \log (cx^n)) \, dx = \frac{(fx)^m (am - bn + bm \log (cx^n))}{fm^2}$$

input
```
Integrate[(f*x)^(-1 + m)*(a + b*Log[c*x^n]),x]
```

output
```
((f*x)^m*(a*m - b*n + b*m*Log[c*x^n]))/(f*m^2)
```

3.354.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {2741}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1}(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \; 2741$$

$$\frac{(fx)^m(a+b\log(cx^n))}{fm}-\frac{bn(fx)^m}{fm^2}$$

input
```
Int[(f*x)^(-1 + m)*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*(f*x)^m)/(f*m^2)) + ((f*x)^m*(a + b*Log[c*x^n]))/(f*m)
```

3.354.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

3.354.4 Maple [A] (verified)

Time = 0.11 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.26

method	result
parallelrisch	$-\frac{-x\ln(cx^n)(fx)^{m-1}bm-x(fx)^{m-1}am+x(fx)^{m-1}bn}{m^2}$
risch	$\frac{bx\,\mathrm{e}^{\frac{(m-1)\left(-i\pi\,\mathrm{csgn}(ifx)^3+i\pi\,\mathrm{csgn}(ifx)^2\,\mathrm{csgn}(if)+i\pi\,\mathrm{csgn}(ifx)^2\,\mathrm{csgn}(ix)-i\pi\,\mathrm{csgn}(ifx)\,\mathrm{csgn}(if)\,\mathrm{csgn}(ix)+2\ln(x)+2\ln(f)\right)}{2}}\ln(x^n)}{m}+$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-x*ln(c*x^n)*(f*x)^(m-1)*b*m-x*(f*x)^(m-1)*a*m+x*(f*x)^(m-1)*b*n)/m^2
```

3.354.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.11

$$\int (fx)^{-1+m}(a+b\log(cx^n))\,dx = \frac{(bmnx\log(x)+bmx\log(c)+(am-bn)x)e^{((m-1)\log(f)+(m-1)\log(x))}}{m^2}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
(b*m*n*x*log(x) + b*m*x*log(c) + (a*m - b*n)*x)*e^((m - 1)*log(f) + (m - 1
)*log(x))/m^2
```

3.354.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 82 vs. 2(31) = 62.

Time = 2.07 (sec) , antiderivative size = 82, normalized size of antiderivative = 2.16

$$\int (fx)^{-1+m}(a+b\log(cx^n))\,dx = \begin{cases} \frac{ax(fx)^{m-1}}{m}+\frac{bx(fx)^{m-1}\log(cx^n)}{m}-\frac{bnx(fx)^{m-1}}{m^2} & \text{for } m\neq 0 \\ \frac{\begin{cases} a\log(x) & \text{for } b=0 \\ -(-a-b\log(c))\log(x) & \text{for } n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}}{f} & \text{otherwise} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*x*(f*x)**(m - 1)/m + b*x*(f*x)**(m - 1)*log(c*x**n)/m - b*n*x
*(f*x)**(m - 1)/m**2, Ne(m, 0)), (Piecewise((a*log(x), Eq(b, 0)), (-(-a -
b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))/f, T
rue))
```

3.354.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.26

$$\int (fx)^{-1+m}(a+b\log(cx^n))\,dx = -\frac{bf^{m-1}nx^m}{m^2}+\frac{(fx)^m b\log(cx^n)}{fm}+\frac{(fx)^m a}{fm}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*f^(m - 1)*n*x^m/m^2 + (f*x)^m*b*log(c*x^n)/(f*m) + (f*x)^m*a/(f*m)
```

3.354.8 Giac [A] (verification not implemented)

Time = 0.34 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.68

$$\int (fx)^{-1+m}(a+b\log(cx^n))\,dx = \frac{bf^m nx^m\log(x)}{fm}+\frac{bf^m x^m\log(c)}{fm}+\frac{af^m x^m}{fm}-\frac{bf^m nx^m}{fm^2}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*f^m*n*x^m*log(x)/(f*m) + b*f^m*x^m*log(c)/(f*m) + a*f^m*x^m/(f*m) - b*f^
m*n*x^m/(f*m^2)
```

3.354.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m}(a+b\log(cx^n))\,dx = \int (f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((f*x)^(m - 1)*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^(m - 1)*(a + b*log(c*x^n)), x)
```

3.355 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx$

3.355.1 Optimal result

Integrand size = 27, antiderivative size = 77

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx = \frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))\log\left(1+\frac{ex^m}{d}\right)}{em} + \frac{bnx^{1-m}(fx)^{-1+m}\operatorname{PolyLog}\left(2,-\frac{ex^m}{d}\right)}{em^2}$$

output
```
x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))*ln(1+e*x^m/d)/e/m+b*n*x^(1-m)*(f*x)^(
-1+m)*polylog(2,-e*x^m/d)/e/m^2
```

3.355.2 Mathematica [A] (warning: unable to verify)

Time = 0.30 (sec) , antiderivative size = 141, normalized size of antiderivative = 1.83

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx = \frac{x^{-m}(fx)^m\left(-bm^2n\log^2(x)+am\log(d-dx^m)+bm\log(cx^n)\log(d-dx^m)-bn\log\left(-\frac{ex^m}{d}\right)\log(d+ex^{\cdots}\right.}{efm^{\cdots}}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m),x]
```

output
```
((f*x)^m*(-(b*m^2*n*Log[x]^2) + a*m*Log[d - d*x^m] + b*m*Log[c*x^n]*Log[d
- d*x^m] - b*n*Log[-((e*x^m)/d)]*Log[d + e*x^m] + m*Log[x]*(a*m + b*m*Log[
c*x^n] - b*n*Log[d - d*x^m] + b*n*Log[d + e*x^m]) - b*n*PolyLog[2, 1 + (e*
x^m)/d]))/(e*f*m^2*x^m)
```

3.355.3 Rubi [A] (verified)

Time = 0.39 (sec) , antiderivative size = 64, normalized size of antiderivative = 0.83, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2777, 2775, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}(a+b\log(cx^n))}{d+ex^m}dx$$

$$\Big\downarrow \ 2777$$

$$x^{1-m}(fx)^{m-1}\int \frac{x^{m-1}(a+b\log(cx^n))}{ex^m+d}dx$$

$$\Big\downarrow \ 2775$$

$$x^{1-m}(fx)^{m-1}\left(\frac{\log\left(\frac{ex^m}{d}+1\right)(a+b\log(cx^n))}{em}-\frac{bn\int \frac{\log\left(\frac{ex^m}{d}+1\right)}{x}dx}{em}\right)$$

$$\Big\downarrow \ 2838$$

$$x^{1-m}(fx)^{m-1}\left(\frac{\log\left(\frac{ex^m}{d}+1\right)(a+b\log(cx^n))}{em}+\frac{bn\,\text{PolyLog}\left(2,-\frac{ex^m}{d}\right)}{em^2}\right)$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m),x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(((a + b*Log[c*x^n])*Log[1 + (e*x^m)/d])/(e*m) +
(b*n*PolyLog[2, -((e*x^m)/d)])/(e*m^2))
```

3.355.3.1 Defintions of rubi rules used

rule 2775
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Simp[b*f^m*n*(p/(e*r))   Int[Log[1 + e*(x^r/d)]*((a +
b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.355.4 Maple [F]

$$\int \frac{(fx)^{m-1} (a+b\ln (c\,x^{n}))}{d+e\,x^{m}}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m),x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m),x)
```

3.355.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 77, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx$$
$$= \frac{bf^{m-1}mn\log(x)\log\left(\frac{ex^m+d}{d}\right)+bf^{m-1}n\mathrm{Li}_2\left(-\frac{ex^m+d}{d}+1\right)+(bm\log(c)+am)f^{m-1}\log(ex^m+d)}{em^2}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m),x, algorithm="fricas")
```

output
```
(b*f^(m - 1)*m*n*log(x)*log((e*x^m + d)/d) + b*f^(m - 1)*n*dilog(-(e*x^m +
 d)/d + 1) + (b*m*log(c) + a*m)*f^(m - 1)*log(e*x^m + d))/(e*m^2)
```

3.355.6 Sympy [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx = \int \frac{(fx)^{m-1}(a+b\log(cx^n))}{d+ex^m}\,dx$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))/(d+e*x**m),x)
```

output
```
Integral((f*x)**(m - 1)*(a + b*log(c*x**n))/(d + e*x**m), x)
```

3.355.7 Maxima [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx = \int \frac{(b\log(cx^n)+a)(fx)^{m-1}}{ex^m+d}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m),x, algorithm="maxima")
```

output
```
b*integrate((f^m*x^m*log(c) + f^m*x^m*log(x^n))/(e*f*x*x^m + d*f*x), x) +
a*f^(m - 1)*log((e*x^m + d)/e)/(e*m)
```

3.355.8 Giac [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx = \int \frac{(b\log(cx^n)+a)(fx)^{m-1}}{ex^m+d}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^(m - 1)/(e*x^m + d), x)
```

3.355.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{d+ex^m}\,dx = \int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))}{d+e\,x^m}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m),x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m), x)
```

3.356 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx$

3.356.1 Optimal result

Integrand size = 27, antiderivative size = 69

$$\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{\left(d+ex^m\right)^2}\,dx=\frac{(fx)^m\left(a+b\log\left(cx^n\right)\right)}{dfm\left(d+ex^m\right)}-\frac{bnx^{-m}(fx)^m\log\left(d+ex^m\right)}{defm^2}$$

output
```
(f*x)^m*(a+b*ln(c*x^n))/d/f/m/(d+e*x^m)-b*n*(f*x)^m*ln(d+e*x^m)/d/e/f/m^2/
(x^m)
```

3.356.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 89, normalized size of antiderivative = 1.29

$$\int \frac{(fx)^{-1+m}\left(a+b\log\left(cx^n\right)\right)}{\left(d+ex^m\right)^2}\,dx = -\frac{x^{-m}(fx)^m\left(adm-bmn(d+ex^m)\log(x)+bdm\log\left(cx^n\right)+bdn\log\left(d+ex^m\right)+benx^m\log\left(d+ex^m\right)\right)}{defm^2\left(d+ex^m\right)}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^2,x]
```

output
```
-(((f*x)^m*(a*d*m - b*m*n*(d + e*x^m)*Log[x] + b*d*m*Log[c*x^n] + b*d*n*Lo
g[d + e*x^m] + b*e*n*x^m*Log[d + e*x^m]))/(d*e*f*m^2*x^m*(d + e*x^m)))
```

3.356.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2773, 800, 792}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}(a+b\log(cx^n))}{(d+ex^m)^2}dx$$

$$\Big\downarrow \text{2773}$$

$$\frac{(fx)^m(a+b\log(cx^n))}{dfm(d+ex^m)}-\frac{bn\int\frac{(fx)^{m-1}}{ex^m+d}dx}{dm}$$

$$\Big\downarrow \text{800}$$

$$\frac{(fx)^m(a+b\log(cx^n))}{dfm(d+ex^m)}-\frac{bnx^{-m}(fx)^m\int\frac{x^{m-1}}{ex^m+d}dx}{dfm}$$

$$\Big\downarrow \text{792}$$

$$\frac{(fx)^m(a+b\log(cx^n))}{dfm(d+ex^m)}-\frac{bnx^{-m}(fx)^m\log(d+ex^m)}{defm^2}$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^2,x]
```

output
```
((f*x)^m*(a + b*Log[c*x^n]))/(d*f*m*(d + e*x^m)) - (b*n*(f*x)^m*Log[d + e*
x^m])/(d*e*f*m^2*x^m)
```

3.356.3.1 Defintions of rubi rules used

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 800
```
Int[((c_)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^Int
Part[m]*((c*x)^FracPart[m]/x^FracPart[m])   Int[x^m*(a + b*x^n)^p, x], x] /
; FreeQ[{a, b, c, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

3.356.4 Maple [F]

$$\int \frac{(fx)^{m-1} (a + b\ln(c\,x^n))}{(d + e\,x^m)^2} dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m)^2,x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m)^2,x)
```

3.356.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 89, normalized size of antiderivative = 1.29

$$\int \frac{(fx)^{-1+m} (a + b\log(cx^n))}{(d + ex^m)^2} dx$$
$$= \frac{bef^{m-1}mnx^m\log(x) - (bdm\log(c) + adm)f^{m-1} - (bef^{m-1}nx^m + bdf^{m-1}n)\log(ex^m + d)}{de^2m^2x^m + d^2em^2}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^2,x, algorithm="fricas")
```

output
```
(b*e*f^(m - 1)*m*n*x^m*log(x) - (b*d*m*log(c) + a*d*m)*f^(m - 1) - (b*e*f^
(m - 1)*n*x^m + b*d*f^(m - 1)*n)*log(e*x^m + d))/(d*e^2*m^2*x^m + d^2*e*m^
2)
```

3.356.6 Sympy [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx = \int \frac{(fx)^{m-1}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))/(d+e*x**m)**2,x)
```

output
```
Integral((f*x)**(m - 1)*(a + b*log(c*x**n))/(d + e*x**m)**2, x)
```

3.356.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.41

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx = bf^m n\left(\frac{\log(x)}{defm} - \frac{\log(ex^m+d)}{defm^2}\right) - \frac{bf^m\log(cx^n)}{e^2fmx^m+defm} - \frac{af^m}{e^2fmx^m+defm}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^2,x, algorithm="maxima")
```

output
```
b*f^m*n*(log(x)/(d*e*f*m) - log(e*x^m + d)/(d*e*f*m^2)) - b*f^m*log(c*x^n)
/(e^2*f*m*x^m + d*e*f*m) - a*f^m/(e^2*f*m*x^m + d*e*f*m)
```

3.356.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 202 vs. 2(69) = 138.

Time = 0.35 (sec) , antiderivative size = 202, normalized size of antiderivative = 2.93

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx = \frac{bef^m mnxx^m\log(x)}{de^2fm^2xx^m+d^2efm^2x} - \frac{bef^m nxx^m\log(ex^m+d)}{de^2fm^2xx^m+d^2efm^2x} - \frac{bdf^m nx\log(ex^m+d)}{de^2fm^2xx^m+d^2efm^2x} - \frac{bdf^m mx\log(c)}{de^2fm^2xx^m+d^2efm^2x} - \frac{adf^m mx}{de^2fm^2xx^m+d^2efm^2x}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^2,x, algorithm="giac")
```

output
```
b*e*f^m*m*n*x*x^m*log(x)/(d*e^2*f*m^2*x*x^m + d^2*e*f*m^2*x) - b*e*f^m*n*x
*x^m*log(e*x^m + d)/(d*e^2*f*m^2*x*x^m + d^2*e*f*m^2*x) - b*d*f^m*n*x*log(
e*x^m + d)/(d*e^2*f*m^2*x*x^m + d^2*e*f*m^2*x) - b*d*f^m*m*x*log(c)/(d*e^2
*f*m^2*x*x^m + d^2*e*f*m^2*x) - a*d*f^m*m*x/(d*e^2*f*m^2*x*x^m + d^2*e*f*m
^2*x)
```

3.356.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^2}\,dx=\int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))}{(d+e\,x^m)^2}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^2,x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^2, x)
```

3.357 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx$

3.357.1 Optimal result

Integrand size = 27, antiderivative size = 150

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx = \frac{bnx^{1-m}(fx)^{-1+m}}{2dem^2(d+ex^m)} + \frac{bnx^{1-m}(fx)^{-1+m}\log(x)}{2d^2em} - \frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{2em(d+ex^m)^2} - \frac{bnx^{1-m}(fx)^{-1+m}\log(d+ex^m)}{2d^2em^2}$$

output
```
1/2*b*n*x^(1-m)*(f*x)^(-1+m)/d/e/m^2/(d+e*x^m)+1/2*b*n*x^(1-m)*(f*x)^(-1+m
)*ln(x)/d^2/e/m-1/2*x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/e/m/(d+e*x^m)^2-1
/2*b*n*x^(1-m)*(f*x)^(-1+m)*ln(d+e*x^m)/d^2/e/m^2
```

3.357.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 137, normalized size of antiderivative = 0.91

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx = \frac{x^{-m}(fx)^m\left(-ad^2m+bd^2n+bdenx^m+bmn(d+ex^m)^2\log(x)-bd^2m\log(cx^n)-bd^2n\log(d+ex^m)-2\right.}{2d^2efm^2(d+ex^m)^2}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^3,x]
```

output
```
((f*x)^m*(-(a*d^2*m) + b*d^2*n + b*d*e*n*x^m + b*m*n*(d + e*x^m)^2*Log[x]
- b*d^2*m*Log[c*x^n] - b*d^2*n*Log[d + e*x^m] - 2*b*d*e*n*x^m*Log[d + e*x^
m] - b*e^2*n*x^(2*m)*Log[d + e*x^m]))/(2*d^2*e*f*m^2*x^m*(d + e*x^m)^2)
```

3.357.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 92, normalized size of antiderivative = 0.61, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185, Rules used = {2777, 2776, 798, 54, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1} (a+b\log(cx^n))}{(d+ex^m)^3}dx$$

$$\Big\downarrow \text{2777}$$

$$x^{1-m}(fx)^{m-1}\int \frac{x^{m-1}(a+b\log(cx^n))}{(ex^m+d)^3}dx$$

$$\Big\downarrow \text{2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int \frac{1}{x(ex^m+d)^2}dx}{2em}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)$$

$$\Big\downarrow \text{798}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int \frac{x^{-m}}{(ex^m+d)^2}dx^m}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)$$

$$\Big\downarrow \text{54}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int \left(\frac{x^{-m}}{d^2}-\frac{e}{d^2(ex^m+d)}-\frac{e}{d(ex^m+d)^2}\right)dx^m}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)$$

$$\Big\downarrow \text{2009}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(-\frac{\log(d+ex^m)}{d^2}+\frac{\log(x^m)}{d^2}+\frac{1}{d(d+ex^m)}\right)}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^3,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/2*(a + b*Log[c*x^n])/(e*m*(d + e*x^m)^2) + (b
*n*(1/(d*(d + e*x^m)) + Log[x^m]/d^2 - Log[d + e*x^m]/d^2))/(2*e*m^2))
```

3.357.3.1 Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

3.357. $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx$

3.357.4 Maple [F]

$$\int \frac{(fx)^{m-1}(a+b\ln(c\,x^n))}{(d+e\,x^m)^3}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m)^3,x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m)^3,x)
```

3.357.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 167, normalized size of antiderivative = 1.11

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx = \frac{be^2f^{m-1}mnx^{2m}\log(x)+(2\,bdemn\log(x)+bden)f^{m-1}x^m-(bd^2m\log(c)+ad^2m-bd^2n)f^{m-1}-(be^2f}{2\,(d^2e^3m^2x^{2m}+2\,d^3e^2m^2x^m+d^4em^2)}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^3,x, algorithm="fricas")
```

output
```
1/2*(b*e^2*f^(m - 1)*m*n*x^(2*m)*log(x) + (2*b*d*e*m*n*log(x) + b*d*e*n)*f
^(m - 1)*x^m - (b*d^2*m*log(c) + a*d^2*m - b*d^2*n)*f^(m - 1) - (b*e^2*f^(
m - 1)*n*x^(2*m) + 2*b*d*e*f^(m - 1)*n*x^m + b*d^2*f^(m - 1)*n)*log(e*x^m
+ d))/(d^2*e^3*m^2*x^(2*m) + 2*d^3*e^2*m^2*x^m + d^4*e*m^2)
```

3.357.6 Sympy [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx = \int \frac{(fx)^{m-1}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))/(d+e*x**m)**3,x)
```

output
```
Integral((f*x)**(m - 1)*(a + b*log(c*x**n))/(d + e*x**m)**3, x)
```

3.357.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.01

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx = \frac{1}{2}bf^mn\left(\frac{1}{(de^2fmx^m+d^2efm)m}+\frac{\log(x)}{d^2efm}-\frac{\log(ex^m+d)}{d^2efm^2}\right) - \frac{bf^m\log(cx^n)}{2\,(e^3fmx^{2\,m}+2\,de^2fmx^m+d^2efm)} - \frac{af^m}{2\,(e^3fmx^{2\,m}+2\,de^2fmx^m+d^2efm)}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^3,x, algorithm="maxima")
```

output
```
1/2*b*f^m*n*(1/((d*e^2*f*m*x^m + d^2*e*f*m)*m) + log(x)/(d^2*e*f*m) - log(
e*x^m + d)/(d^2*e*f*m^2)) - 1/2*b*f^m*log(c*x^n)/(e^3*f*m*x^(2*m) + 2*d*e^
2*f*m*x^m + d^2*e*f*m) - 1/2*a*f^m/(e^3*f*m*x^(2*m) + 2*d*e^2*f*m*x^m + d^
2*e*f*m)
```

3.357.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 633 vs. $2(142) = 284$.

Time = 0.36 (sec) , antiderivative size = 633, normalized size of antiderivative = 4.22

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx = \frac{be^2f^mmnx^2x^{2\,m}\log(x)}{2\,(d^2e^3fm^2x^2x^{2\,m}+2\,d^3e^2fm^2x^2x^m+d^4efm^2x^2)} + \frac{bdef^mmnx^2x^m\log(x)}{d^2e^3fm^2x^2x^{2\,m}+2\,d^3e^2fm^2x^2x^m+d^4efm^2x^2} - \frac{be^2f^mnx^2x^{2\,m}\log(ex^m+d)}{2\,(d^2e^3fm^2x^2x^{2\,m}+2\,d^3e^2fm^2x^2x^m+d^4efm^2x^2)} - \frac{bdef^mnx^2x^m\log(ex^m+d)}{d^2e^3fm^2x^2x^{2\,m}+2\,d^3e^2fm^2x^2x^m+d^4efm^2x^2} + \frac{bdef^mnx^2x^m}{2\,(d^2e^3fm^2x^2x^{2\,m}+2\,d^3e^2fm^2x^2x^m+d^4efm^2x^2)} - \frac{bd^2f^mnx^2\log(ex^m+d)}{2\,(d^2e^3fm^2x^2x^{2\,m}+2\,d^3e^2fm^2x^2x^m+d^4efm^2x^2)} - \frac{bd^2f^mmx^2\log(c)}{2\,(d^2e^3fm^2x^2x^{2\,m}+2\,d^3e^2fm^2x^2x^m+d^4efm^2x^2)} - \frac{ad^2f^mmx^2}{2\,(d^2e^3fm^2x^2x^{2\,m}+2\,d^3e^2fm^2x^2x^m+d^4efm^2x^2)} + \frac{bd^2f^mnx^2}{2\,(d^2e^3fm^2x^2x^{2\,m}+2\,d^3e^2fm^2x^2x^m+d^4efm^2x^2)}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^3,x, algorithm="giac")
```

output
```
1/2*b*e^2*f^m*m*n*x^2*x^(2*m)*log(x)/(d^2*e^3*f*m^2*x^2*x^(2*m) + 2*d^3*e^
2*f*m^2*x^2*x^m + d^4*e*f*m^2*x^2) + b*d*e*f^m*m*n*x^2*x^m*log(x)/(d^2*e^3
*f*m^2*x^2*x^(2*m) + 2*d^3*e^2*f*m^2*x^2*x^m + d^4*e*f*m^2*x^2) - 1/2*b*e^
2*f^m*n*x^2*x^(2*m)*log(e*x^m + d)/(d^2*e^3*f*m^2*x^2*x^(2*m) + 2*d^3*e^2*
f*m^2*x^2*x^m + d^4*e*f*m^2*x^2) - b*d*e*f^m*n*x^2*x^m*log(e*x^m + d)/(d^2
*e^3*f*m^2*x^2*x^(2*m) + 2*d^3*e^2*f*m^2*x^2*x^m + d^4*e*f*m^2*x^2) + 1/2*
b*d*e*f^m*n*x^2*x^m/(d^2*e^3*f*m^2*x^2*x^(2*m) + 2*d^3*e^2*f*m^2*x^2*x^m +
 d^4*e*f*m^2*x^2) - 1/2*b*d^2*f^m*n*x^2*log(e*x^m + d)/(d^2*e^3*f*m^2*x^2*
x^(2*m) + 2*d^3*e^2*f*m^2*x^2*x^m + d^4*e*f*m^2*x^2) - 1/2*b*d^2*f^m*m*x^2
*log(c)/(d^2*e^3*f*m^2*x^2*x^(2*m) + 2*d^3*e^2*f*m^2*x^2*x^m + d^4*e*f*m^2
*x^2) - 1/2*a*d^2*f^m*m*x^2/(d^2*e^3*f*m^2*x^2*x^(2*m) + 2*d^3*e^2*f*m^2*x
^2*x^m + d^4*e*f*m^2*x^2) + 1/2*b*d^2*f^m*n*x^2/(d^2*e^3*f*m^2*x^2*x^(2*m)
 + 2*d^3*e^2*f*m^2*x^2*x^m + d^4*e*f*m^2*x^2)
```

3.357.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^3}\,dx = \int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))}{(d+e\,x^m)^3}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^3,x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^3, x)
```

3.358 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx$

3.358.1 Optimal result

Integrand size = 27, antiderivative size = 188

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx = \frac{bnx^{1-m}(fx)^{-1+m}}{6dem^2(d+ex^m)^2} + \frac{bnx^{1-m}(fx)^{-1+m}}{3d^2em^2(d+ex^m)} + \frac{bnx^{1-m}(fx)^{-1+m}\log(x)}{3d^3em} - \frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{3em(d+ex^m)^3} - \frac{bnx^{1-m}(fx)^{-1+m}\log(d+ex^m)}{3d^3em^2}$$

output
```
1/6*b*n*x^(1-m)*(f*x)^(-1+m)/d/e/m^2/(d+e*x^m)^2+1/3*b*n*x^(1-m)*(f*x)^(-1
+m)/d^2/e/m^2/(d+e*x^m)+1/3*b*n*x^(1-m)*(f*x)^(-1+m)*ln(x)/d^3/e/m-1/3*x^(
1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/e/m/(d+e*x^m)^3-1/3*b*n*x^(1-m)*(f*x)^(-
1+m)*ln(d+e*x^m)/d^3/e/m^2
```

3.358.2 Mathematica [A] (verified)

Time = 0.29 (sec) , antiderivative size = 178, normalized size of antiderivative = 0.95

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx$$
$$= \frac{x^{-m}(fx)^m\left(-2ad^3m+3bd^3n+5bd^2enx^m+2bde^2nx^{2m}+2bmn(d+ex^m)^3\log(x)-2bd^3m\log(cx^n)-2b\right.}{6d^3efm^2\left(d+\right.}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^4,x]
```

output
```
((f*x)^m*(-2*a*d^3*m + 3*b*d^3*n + 5*b*d^2*e*n*x^m + 2*b*d*e^2*n*x^(2*m) +
 2*b*m*n*(d + e*x^m)^3*Log[x] - 2*b*d^3*m*Log[c*x^n] - 2*b*d^3*n*Log[d + e
*x^m] - 6*b*d^2*e*n*x^m*Log[d + e*x^m] - 6*b*d*e^2*n*x^(2*m)*Log[d + e*x^m
] - 2*b*e^3*n*x^(3*m)*Log[d + e*x^m]))/(6*d^3*e*f*m^2*x^m*(d + e*x^m)^3)
```

3.358.3 Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 108, normalized size of antiderivative = 0.57, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$, Rules used = {2777, 2776, 798, 54, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx$$

$$\Big\downarrow \text{ 2777}$$

$$x^{1-m}(fx)^{m-1}\int \frac{x^{m-1}(a+b\log(cx^n))}{(ex^m+d)^4}dx$$

$$\Big\downarrow \text{ 2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int \frac{1}{x(ex^m+d)^3}dx}{3em}-\frac{a+b\log(cx^n)}{3em(d+ex^m)^3}\right)$$

$$\Big\downarrow \text{ 798}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int \frac{x^{-m}}{(ex^m+d)^3}dx^m}{3em^2}-\frac{a+b\log(cx^n)}{3em(d+ex^m)^3}\right)$$

$$\Big\downarrow \text{54}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int\left(\frac{x^{-m}}{d^3}-\frac{e}{d^3(ex^m+d)}-\frac{e}{d^2(ex^m+d)^2}-\frac{e}{d(ex^m+d)^3}\right)dx^m}{3em^2}-\frac{a+b\log(cx^n)}{3em(d+ex^m)^3}\right)$$

$$\Big\downarrow \text{2009}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(-\frac{\log(d+ex^m)}{d^3}+\frac{\log(x^m)}{d^3}+\frac{1}{d^2(d+ex^m)}+\frac{1}{2d(d+ex^m)^2}\right)}{3em^2}-\frac{a+b\log(cx^n)}{3em(d+ex^m)^3}\right)$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n]))/(d + e*x^m)^4,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/3*(a + b*Log[c*x^n])/(e*m*(d + e*x^m)^3) + (b
*n*(1/(2*d*(d + e*x^m)^2) + 1/(d^2*(d + e*x^m)) + Log[x^m]/d^3 - Log[d + e
*x^m]/d^3))/(3*e*m^2))
```

3.358.3.1 Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

3.358.4 Maple [F]

$$\int \frac{(fx)^{m-1} (a+b\ln(c\,x^n))}{(d+e\,x^m)^4}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m)^4,x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))/(d+e*x^m)^4,x)
```

3.358.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 242, normalized size of antiderivative = 1.29

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx = \frac{2\,be^3f^{m-1}mnx^{3\,m}\log(x) + 2\,(3\,bde^2mn\log(x) + bde^2n)f^{m-1}x^{2\,m} + (6\,bd^2emn\log(x) + 5\,bd^2en)f^{m-1}x^m}{6\,(d^3e^4m^2x^{3\,m} +}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^4,x, algorithm="fricas")
```

output
```
1/6*(2*b*e^3*f^(m - 1)*m*n*x^(3*m)*log(x) + 2*(3*b*d*e^2*m*n*log(x) + b*d*
e^2*n)*f^(m - 1)*x^(2*m) + (6*b*d^2*e*m*n*log(x) + 5*b*d^2*e*n)*f^(m - 1)*
x^m - (2*b*d^3*m*log(c) + 2*a*d^3*m - 3*b*d^3*n)*f^(m - 1) - 2*(b*e^3*f^(m
 - 1)*n*x^(3*m) + 3*b*d*e^2*f^(m - 1)*n*x^(2*m) + 3*b*d^2*e*f^(m - 1)*n*x^
m + b*d^3*f^(m - 1)*n)*log(e*x^m + d))/(d^3*e^4*m^2*x^(3*m) + 3*d^4*e^3*m^
2*x^(2*m) + 3*d^5*e^2*m^2*x^m + d^6*e*m^2)
```

3.358.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx = \text{Timed out}$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))/(d+e*x**m)**4,x)
```

output
```
Timed out
```

3.358.7 Maxima [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 210, normalized size of antiderivative = 1.12

$$\begin{aligned}
&\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx \\
&= \frac{1}{6}bf^m n\left(\frac{2\,ex^m+3\,d}{(d^2e^3fmx^{2\,m}+2\,d^3e^2fmx^m+d^4efm)m}+\frac{2\,\log(x)}{d^3efm}-\frac{2\,\log(ex^m+d)}{d^3efm^2}\right) \\
&\quad-\frac{bf^m\log(cx^n)}{3\,(e^4fmx^{3\,m}+3\,de^3fmx^{2\,m}+3\,d^2e^2fmx^m+d^3efm)} \\
&\quad-\frac{af^m}{3\,(e^4fmx^{3\,m}+3\,de^3fmx^{2\,m}+3\,d^2e^2fmx^m+d^3efm)}
\end{aligned}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^4,x, algorithm="maxima")
```

output
```
1/6*b*f^m*n*((2*e*x^m + 3*d)/((d^2*e^3*f*m*x^(2*m) + 2*d^3*e^2*f*m*x^m + d
^4*e*f*m)*m) + 2*log(x)/(d^3*e*f*m) - 2*log(e*x^m + d)/(d^3*e*f*m^2)) - 1/
3*b*f^m*log(c*x^n)/(e^4*f*m*x^(3*m) + 3*d*e^3*f*m*x^(2*m) + 3*d^2*e^2*f*m*
x^m + d^3*e*f*m) - 1/3*a*f^m/(e^4*f*m*x^(3*m) + 3*d*e^3*f*m*x^(2*m) + 3*d^
2*e^2*f*m*x^m + d^3*e*f*m)
```

3.358.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1102 vs. $2(178) = 356$.

Time = 0.37 (sec) , antiderivative size = 1102, normalized size of antiderivative = 5.86

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx = \frac{be^3f^mmnx^3x^{3m}\log(x)}{3(d^3e^4fm^2x^3x^{3m}+3d^4e^3fm^2x^3x^{2m}+3d^5e^2fm^2x^3x^m+d^6efm^2x^3)} + \frac{bde^2f^mmnx^3x^{2m}\log(x)}{d^3e^4fm^2x^3x^{3m}+3d^4e^3fm^2x^3x^{2m}+3d^5e^2fm^2x^3x^m+d^6efm^2x^3} + \frac{bd^2ef^mmnx^3x^m\log(x)}{d^3e^4fm^2x^3x^{3m}+3d^4e^3fm^2x^3x^{2m}+3d^5e^2fm^2x^3x^m+d^6efm^2x^3} - \frac{be^3f^mnx^3x^{3m}\log(ex^m+d)}{3(d^3e^4fm^2x^3x^{3m}+3d^4e^3fm^2x^3x^{2m}+3d^5e^2fm^2x^3x^m+d^6efm^2x^3)} - \frac{bde^2f^mnx^3x^{2m}\log(ex^m+d)}{d^3e^4fm^2x^3x^{3m}+3d^4e^3fm^2x^3x^{2m}+3d^5e^2fm^2x^3x^m+d^6efm^2x^3} - \frac{bd^2ef^mnx^3x^m\log(ex^m+d)}{d^3e^4fm^2x^3x^{3m}+3d^4e^3fm^2x^3x^{2m}+3d^5e^2fm^2x^3x^m+d^6efm^2x^3} + \frac{bde^2f^mnx^3x^{2m}}{3(d^3e^4fm^2x^3x^{3m}+3d^4e^3fm^2x^3x^{2m}+3d^5e^2fm^2x^3x^m+d^6efm^2x^3)} + \frac{5bd^2ef^mnx^3x^m}{6(d^3e^4fm^2x^3x^{3m}+3d^4e^3fm^2x^3x^{2m}+3d^5e^2fm^2x^3x^m+d^6efm^2x^3)} - \frac{bd^3f^mnx^3\log(ex^m+d)}{3(d^3e^4fm^2x^3x^{3m}+3d^4e^3fm^2x^3x^{2m}+3d^5e^2fm^2x^3x^m+d^6efm^2x^3)} - \frac{bd^3f^mmx^3\log(c)}{3(d^3e^4fm^2x^3x^{3m}+3d^4e^3fm^2x^3x^{2m}+3d^5e^2fm^2x^3x^m+d^6efm^2x^3)} - \frac{ad^3f^mmx^3}{3(d^3e^4fm^2x^3x^{3m}+3d^4e^3fm^2x^3x^{2m}+3d^5e^2fm^2x^3x^m+d^6efm^2x^3)} + \frac{bd^3f^mnx^3}{2(d^3e^4fm^2x^3x^{3m}+3d^4e^3fm^2x^3x^{2m}+3d^5e^2fm^2x^3x^m+d^6efm^2x^3)}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))/(d+e*x^m)^4,x, algorithm="giac")
```

output
```
1/3*b*e^3*f^m*m*n*x^3*x^(3*m)*log(x)/(d^3*e^4*f*m^2*x^3*x^(3*m) + 3*d^4*e^
3*f*m^2*x^3*x^(2*m) + 3*d^5*e^2*f*m^2*x^3*x^m + d^6*e*f*m^2*x^3) + b*d*e^2
*f^m*m*n*x^3*x^(2*m)*log(x)/(d^3*e^4*f*m^2*x^3*x^(3*m) + 3*d^4*e^3*f*m^2*x
^3*x^(2*m) + 3*d^5*e^2*f*m^2*x^3*x^m + d^6*e*f*m^2*x^3) + b*d^2*e*f^m*m*n*
x^3*x^m*log(x)/(d^3*e^4*f*m^2*x^3*x^(3*m) + 3*d^4*e^3*f*m^2*x^3*x^(2*m) +
3*d^5*e^2*f*m^2*x^3*x^m + d^6*e*f*m^2*x^3) - 1/3*b*e^3*f^m*n*x^3*x^(3*m)*l
og(e*x^m + d)/(d^3*e^4*f*m^2*x^3*x^(3*m) + 3*d^4*e^3*f*m^2*x^3*x^(2*m) + 3
*d^5*e^2*f*m^2*x^3*x^m + d^6*e*f*m^2*x^3) - b*d*e^2*f^m*n*x^3*x^(2*m)*log(
e*x^m + d)/(d^3*e^4*f*m^2*x^3*x^(3*m) + 3*d^4*e^3*f*m^2*x^3*x^(2*m) + 3*d^
5*e^2*f*m^2*x^3*x^m + d^6*e*f*m^2*x^3) - b*d^2*e*f^m*n*x^3*x^m*log(e*x^m +
 d)/(d^3*e^4*f*m^2*x^3*x^(3*m) + 3*d^4*e^3*f*m^2*x^3*x^(2*m) + 3*d^5*e^2*f
*m^2*x^3*x^m + d^6*e*f*m^2*x^3) + 1/3*b*d*e^2*f^m*n*x^3*x^(2*m)/(d^3*e^4*f
*m^2*x^3*x^(3*m) + 3*d^4*e^3*f*m^2*x^3*x^(2*m) + 3*d^5*e^2*f*m^2*x^3*x^m +
 d^6*e*f*m^2*x^3) + 5/6*b*d^2*e*f^m*n*x^3*x^m/(d^3*e^4*f*m^2*x^3*x^(3*m) +
 3*d^4*e^3*f*m^2*x^3*x^(2*m) + 3*d^5*e^2*f*m^2*x^3*x^m + d^6*e*f*m^2*x^3)
- 1/3*b*d^3*f^m*n*x^3*log(e*x^m + d)/(d^3*e^4*f*m^2*x^3*x^(3*m) + 3*d^4*e^
3*f*m^2*x^3*x^(2*m) + 3*d^5*e^2*f*m^2*x^3*x^m + d^6*e*f*m^2*x^3) - 1/3*b*d
^3*f^m*m*x^3*log(c)/(d^3*e^4*f*m^2*x^3*x^(3*m) + 3*d^4*e^3*f*m^2*x^3*x^(2*
m) + 3*d^5*e^2*f*m^2*x^3*x^m + d^6*e*f*m^2*x^3) - 1/3*a*d^3*f^m*m*x^3/(d^3
*e^4*f*m^2*x^3*x^(3*m) + 3*d^4*e^3*f*m^2*x^3*x^(2*m) + 3*d^5*e^2*f*m^2*...
```

3.358.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))}{(d+ex^m)^4}\,dx=\int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))}{(d+e\,x^m)^4}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^4,x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n)))/(d + e*x^m)^4, x)
```

3.359 $\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))^2 \, dx$

3.359.1 Optimal result

Integrand size = 29, antiderivative size = 372

$$\begin{aligned}\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))^2 \, dx = {} & \frac{2b^2d^3n^2x(fx)^{-1+m}}{m^3} + \frac{3b^2d^2en^2x^{1+m}(fx)^{-1+m}}{4m^3} \\ & + \frac{2b^2de^2n^2x^{1+2m}(fx)^{-1+m}}{9m^3} \\ & + \frac{b^2e^3n^2x^{1+3m}(fx)^{-1+m}}{32m^3} \\ & + \frac{b^2d^4n^2x^{1-m}(fx)^{-1+m}\log^2(x)}{4em} \\ & - \frac{2bd^3nx(fx)^{-1+m}(a+b\log(cx^n))}{m^2} \\ & - \frac{3bd^2enx^{1+m}(fx)^{-1+m}(a+b\log(cx^n))}{2m^2} \\ & - \frac{2bde^2nx^{1+2m}(fx)^{-1+m}(a+b\log(cx^n))}{3m^2} \\ & - \frac{be^3nx^{1+3m}(fx)^{-1+m}(a+b\log(cx^n))}{8m^2} \\ & - \frac{bd^4nx^{1-m}(fx)^{-1+m}\log(x)(a+b\log(cx^n))}{2em} \\ & + \frac{x^{1-m}(fx)^{-1+m}(d+ex^m)^4(a+b\log(cx^n))^2}{4em}\end{aligned}$$

output
```
2*b^2*d^3*n^2*x*(f*x)^(-1+m)/m^3+3/4*b^2*d^2*e*n^2*x^(1+m)*(f*x)^(-1+m)/m^
3+2/9*b^2*d*e^2*n^2*x^(1+2*m)*(f*x)^(-1+m)/m^3+1/32*b^2*e^3*n^2*x^(1+3*m)*
(f*x)^(-1+m)/m^3+1/4*b^2*d^4*n^2*x^(1-m)*(f*x)^(-1+m)*ln(x)^2/e/m-2*b*d^3*
n*x*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-3/2*b*d^2*e*n*x^(1+m)*(f*x)^(-1+m)*(a
+b*ln(c*x^n))/m^2-2/3*b*d*e^2*n*x^(1+2*m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2
-1/8*b*e^3*n*x^(1+3*m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-1/2*b*d^4*n*x^(1-m
)*(f*x)^(-1+m)*ln(x)*(a+b*ln(c*x^n))/e/m+1/4*x^(1-m)*(f*x)^(-1+m)*(d+e*x^m
)^4*(a+b*ln(c*x^n))^2/e/m
```

3.359.2 Mathematica [A] (verified)

Time = 0.19 (sec) , antiderivative size = 285, normalized size of antiderivative = 0.77

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))^2\,dx$$
$$=\frac{(fx)^m\left(72a^2m^2(4d^3+6d^2ex^m+4de^2x^{2m}+e^3x^{3m})-12abmn(48d^3+36d^2ex^m+16de^2x^{2m}+3e^3x^{3m})+\cdots\right.}{}$$

input
```
Integrate[(f*x)^(-1 + m)*(d + e*x^m)^3*(a + b*Log[c*x^n])^2,x]
```

output
```
((f*x)^m*(72*a^2*m^2*(4*d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m))
 - 12*a*b*m*n*(48*d^3 + 36*d^2*e*x^m + 16*d*e^2*x^(2*m) + 3*e^3*x^(3*m)) +
 b^2*n^2*(576*d^3 + 216*d^2*e*x^m + 64*d*e^2*x^(2*m) + 9*e^3*x^(3*m)) + 12
*b*m*(12*a*m*(4*d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m)) - b*n*(
48*d^3 + 36*d^2*e*x^m + 16*d*e^2*x^(2*m) + 3*e^3*x^(3*m)))*Log[c*x^n] + 72
*b^2*m^2*(4*d^3 + 6*d^2*e*x^m + 4*d*e^2*x^(2*m) + e^3*x^(3*m))*Log[c*x^n]^
2))/(288*f*m^3)
```

3.359.3 Rubi [A] (verified)

Time = 0.75 (sec) , antiderivative size = 252, normalized size of antiderivative = 0.68, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.138$, Rules used = {2777, 2776, 2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1}(d+ex^m)^3(a+b\log(cx^n))^2\,dx$$

$$\Big\downarrow \; 2777$$

$$x^{1-m}(fx)^{m-1}\int x^{m-1}(ex^m+d)^3\left(a+b\log\left(cx^n\right)\right)^2dx$$

$$\Big\downarrow \; 2776$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^4\left(a+b\log\left(cx^n\right)\right)^2}{4em}-\frac{bn\int\frac{(ex^m+d)^4(a+b\log(cx^n))}{x}dx}{2em}\right)$$

$$\Big\downarrow \; 2772$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^4\left(a+b\log\left(cx^n\right)\right)^2}{4em}-\frac{bn\left(-bn\int\left(\frac{e(36d^2ex^m+16de^2x^{2m}+3e^3x^{3m}+48d^3)x^{m-1}}{12m}+\frac{d^4\log(x)}{x}\right)dx+\right.}{}\right.$$

$$\Big\downarrow \; 2009$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^4\left(a+b\log\left(cx^n\right)\right)^2}{4em}-\frac{bn\left(d^4\log(x)\left(a+b\log\left(cx^n\right)\right)+\frac{4d^3ex^m(a+b\log(cx^n))}{m}+\frac{3d^2e^2x^{2m}(a+b}{m}\right.}{}\right.$$

input
```
Int[(f*x)^(-1 + m)*(d + e*x^m)^3*(a + b*Log[c*x^n])^2,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(((d + e*x^m)^4*(a + b*Log[c*x^n])^2)/(4*e*m) - (
b*n*(-(b*n*((4*d^3*e*x^m)/m^2 + (3*d^2*e^2*x^(2*m))/(2*m^2) + (4*d*e^3*x^(
3*m))/(9*m^2) + (e^4*x^(4*m))/(16*m^2) + (d^4*Log[x]^2)/2)) + (4*d^3*e*x^m
*(a + b*Log[c*x^n]))/m + (3*d^2*e^2*x^(2*m)*(a + b*Log[c*x^n]))/m + (4*d*e
^3*x^(3*m)*(a + b*Log[c*x^n]))/(3*m) + (e^4*x^(4*m)*(a + b*Log[c*x^n]))/(4
*m) + d^4*Log[x]*(a + b*Log[c*x^n])))/(2*e*m))
```

3.359.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

3.359.4 Maple [A] (verified)

Time = 205.35 (sec) , antiderivative size = 617, normalized size of antiderivative = 1.66

method	result
parallelrisch	$-\frac{-288b^2d^3(fx)^{m-1}\ln(c\,x^n)^2x\,m^2-72x\,x^{3m}(fx)^{m-1}a^2e^3m^2-9x\,x^{3m}(fx)^{m-1}b^2e^3n^2-432b^2d^2e(fx)^{m-1}\ln(c\,x^n)^2x^mx\,m^2}{}$
risch	Expression too large to display

input
```
int((f*x)^(m-1)*(d+e*x^m)^3*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
-1/288*(-288*b^2*d^3*(f*x)^(m-1)*ln(c*x^n)^2*x*m^2-72*x*(x^m)^3*(f*x)^(m-1
)*a^2*e^3*m^2-9*x*(x^m)^3*(f*x)^(m-1)*b^2*e^3*n^2-432*b^2*d^2*e*(f*x)^(m-1
)*ln(c*x^n)^2*x^m*x*m^2-864*x*x^m*ln(c*x^n)*(f*x)^(m-1)*a*b*d^2*e*m^2+432*
x*x^m*ln(c*x^n)*(f*x)^(m-1)*b^2*d^2*e*m*n-576*x*(x^m)^2*ln(c*x^n)*(f*x)^(m
-1)*a*b*d*e^2*m^2+192*x*(x^m)^2*ln(c*x^n)*(f*x)^(m-1)*b^2*d*e^2*m*n+432*x*
x^m*(f*x)^(m-1)*a*b*d^2*e*m*n+192*x*(x^m)^2*(f*x)^(m-1)*a*b*d*e^2*m*n-288*
x*(f*x)^(m-1)*a^2*d^3*m^2-576*x*(f*x)^(m-1)*b^2*d^3*n^2-216*x*x^m*(f*x)^(m
-1)*b^2*d^2*e*n^2-288*x*(x^m)^2*(f*x)^(m-1)*a^2*d*e^2*m^2-64*x*(x^m)^2*(f*
x)^(m-1)*b^2*d*e^2*n^2-72*b^2*e^3*(f*x)^(m-1)*ln(c*x^n)^2*x*(x^m)^3*m^2-57
6*x*ln(c*x^n)*(f*x)^(m-1)*a*b*d^3*m^2+576*x*ln(c*x^n)*(f*x)^(m-1)*b^2*d^3*
m*n+576*x*(f*x)^(m-1)*a*b*d^3*m*n-432*x*x^m*(f*x)^(m-1)*a^2*d^2*e*m^2+36*x
*(x^m)^3*(f*x)^(m-1)*a*b*e^3*m*n-144*x*(x^m)^3*ln(c*x^n)*(f*x)^(m-1)*a*b*e
^3*m^2+36*x*(x^m)^3*ln(c*x^n)*(f*x)^(m-1)*b^2*e^3*m*n-288*b^2*d*e^2*(f*x)^
(m-1)*ln(c*x^n)^2*(x^m)^2*x*m^2)/m^3
```

3.359.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 592, normalized size of antiderivative = 1.59

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))^2\,dx$$
$$= \frac{9\left(8\,b^2e^3m^2n^2\log(x)^2+8\,b^2e^3m^2\log(c)^2+8\,a^2e^3m^2-4\,abe^3mn+b^2e^3n^2+4\left(4\,abe^3m^2-b^2e^3mn\right)\log(c\right.}{}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n))^2,x, algorithm="fricas
")
```

output
```
1/288*(9*(8*b^2*e^3*m^2*n^2*log(x)^2 + 8*b^2*e^3*m^2*log(c)^2 + 8*a^2*e^3*
m^2 - 4*a*b*e^3*m*n + b^2*e^3*n^2 + 4*(4*a*b*e^3*m^2 - b^2*e^3*m*n)*log(c)
 + 4*(4*b^2*e^3*m^2*n*log(c) + 4*a*b*e^3*m^2*n - b^2*e^3*m*n^2)*log(x))*f^
(m - 1)*x^(4*m) + 32*(9*b^2*d*e^2*m^2*n^2*log(x)^2 + 9*b^2*d*e^2*m^2*log(c
)^2 + 9*a^2*d*e^2*m^2 - 6*a*b*d*e^2*m*n + 2*b^2*d*e^2*n^2 + 6*(3*a*b*d*e^2
*m^2 - b^2*d*e^2*m*n)*log(c) + 6*(3*b^2*d*e^2*m^2*n*log(c) + 3*a*b*d*e^2*m
^2*n - b^2*d*e^2*m*n^2)*log(x))*f^(m - 1)*x^(3*m) + 216*(2*b^2*d^2*e*m^2*n
^2*log(x)^2 + 2*b^2*d^2*e*m^2*log(c)^2 + 2*a^2*d^2*e*m^2 - 2*a*b*d^2*e*m*n
 + b^2*d^2*e*n^2 + 2*(2*a*b*d^2*e*m^2 - b^2*d^2*e*m*n)*log(c) + 2*(2*b^2*d
^2*e*m^2*n*log(c) + 2*a*b*d^2*e*m^2*n - b^2*d^2*e*m*n^2)*log(x))*f^(m - 1)
*x^(2*m) + 288*(b^2*d^3*m^2*n^2*log(x)^2 + b^2*d^3*m^2*log(c)^2 + a^2*d^3*
m^2 - 2*a*b*d^3*m*n + 2*b^2*d^3*n^2 + 2*(a*b*d^3*m^2 - b^2*d^3*m*n)*log(c)
 + 2*(b^2*d^3*m^2*n*log(c) + a*b*d^3*m^2*n - b^2*d^3*m*n^2)*log(x))*f^(m -
 1)*x^m)/m^3
```

3.359.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 760 vs. 2(364) = 728.

Time = 38.32 (sec) , antiderivative size = 760, normalized size of antiderivative = 2.04

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))^2\,dx$$
$$= \begin{cases} \frac{a^2d^3x(fx)^{m-1}}{m}+\frac{3a^2d^2exx^m(fx)^{m-1}}{2m}+\frac{a^2de^2xx^{2m}(fx)^{m-1}}{m}+\frac{a^2e^3xx^{3m}(fx)^{m-1}}{4m}+\frac{2abd^3x(fx)^{m-1}\log(cx^n)}{m}-\frac{2abd^3nx(fx)^{m-1}}{m^2} \\ \frac{(d+e)^3\left(\begin{cases}\frac{a^2\log(cx^n)+ab\log(cx^n)^2+\frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n\neq 0\\ \left(a^2+2ab\log(c)+b^2\log(c)^2\right)\log(x) & \text{otherwise}\end{cases}\right)}{f} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(d+e*x**m)**3*(a+b*ln(c*x**n))**2,x)
```

output
```
Piecewise((a**2*d**3*x*(f*x)**(m - 1)/m + 3*a**2*d**2*e*x*x**m*(f*x)**(m -
 1)/(2*m) + a**2*d*e**2*x*x**(2*m)*(f*x)**(m - 1)/m + a**2*e**3*x*x**(3*m)
*(f*x)**(m - 1)/(4*m) + 2*a*b*d**3*x*(f*x)**(m - 1)*log(c*x**n)/m - 2*a*b*
d**3*n*x*(f*x)**(m - 1)/m**2 + 3*a*b*d**2*e*x*x**m*(f*x)**(m - 1)*log(c*x*
*n)/m - 3*a*b*d**2*e*n*x*x**m*(f*x)**(m - 1)/(2*m**2) + 2*a*b*d*e**2*x*x**
(2*m)*(f*x)**(m - 1)*log(c*x**n)/m - 2*a*b*d*e**2*n*x*x**(2*m)*(f*x)**(m -
 1)/(3*m**2) + a*b*e**3*x*x**(3*m)*(f*x)**(m - 1)*log(c*x**n)/(2*m) - a*b*
e**3*n*x*x**(3*m)*(f*x)**(m - 1)/(8*m**2) + b**2*d**3*x*(f*x)**(m - 1)*log
(c*x**n)**2/m - 2*b**2*d**3*n*x*(f*x)**(m - 1)*log(c*x**n)/m**2 + 2*b**2*d
**3*n**2*x*(f*x)**(m - 1)/m**3 + 3*b**2*d**2*e*x*x**m*(f*x)**(m - 1)*log(c
*x**n)**2/(2*m) - 3*b**2*d**2*e*n*x*x**m*(f*x)**(m - 1)*log(c*x**n)/(2*m**
2) + 3*b**2*d**2*e*n**2*x*x**m*(f*x)**(m - 1)/(4*m**3) + b**2*d*e**2*x*x**
(2*m)*(f*x)**(m - 1)*log(c*x**n)**2/m - 2*b**2*d*e**2*n*x*x**(2*m)*(f*x)**
(m - 1)*log(c*x**n)/(3*m**2) + 2*b**2*d*e**2*n**2*x*x**(2*m)*(f*x)**(m - 1
)/(9*m**3) + b**2*e**3*x*x**(3*m)*(f*x)**(m - 1)*log(c*x**n)**2/(4*m) - b*
*2*e**3*n*x*x**(3*m)*(f*x)**(m - 1)*log(c*x**n)/(8*m**2) + b**2*e**3*n**2*
x*x**(3*m)*(f*x)**(m - 1)/(32*m**3), Ne(m, 0)), ((d + e)**3*Piecewise(((a*
*2*log(c*x**n) + a*b*log(c*x**n)**2 + b**2*log(c*x**n)**3/3)/n, Ne(n, 0)),
 ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*log(x), True))/f, True))
```

3.359. $\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))^2 \, dx$

3.359.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 578, normalized size of antiderivative = 1.55

$$\int (fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))^2\,dx$$
$$= \frac{b^2e^3f^{m-1}x^{4m}\log(cx^n)^2}{4m} + \frac{b^2de^2f^{m-1}x^{3m}\log(cx^n)^2}{m} + \frac{3b^2d^2ef^{m-1}x^{2m}\log(cx^n)^2}{2m} + \frac{abe^3f^{m-1}x^{4m}\log(cx^n)}{2m} + \frac{2abde^2f^{m-1}x^{3m}\log(cx^n)}{m} + \frac{3abd^2ef^{m-1}x^{2m}\log(cx^n)}{m} - 2\left(\frac{f^{m-1}nx^m\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^m}{m^3}\right)b^2d^3 - \frac{3}{4}\left(\frac{2f^{m-1}nx^{2m}\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^{2m}}{m^3}\right)b^2d^2e - \frac{2}{9}\left(\frac{3f^{m-1}nx^{3m}\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^{3m}}{m^3}\right)b^2de^2 - \frac{1}{32}\left(\frac{4f^{m-1}nx^{4m}\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^{4m}}{m^3}\right)b^2e^3 + \frac{a^2e^3f^{m-1}x^{4m}}{4m} - \frac{abe^3f^{m-1}nx^{4m}}{8m^2} + \frac{a^2de^2f^{m-1}x^{3m}}{m} - \frac{2abde^2f^{m-1}nx^{3m}}{3m^2} + \frac{3a^2d^2ef^{m-1}x^{2m}}{2m} - \frac{3abd^2ef^{m-1}nx^{2m}}{2m^2} - \frac{2abd^3f^{m-1}nx^m}{m^2} + \frac{(fx)^m b^2d^3\log(cx^n)^2}{fm} + \frac{2(fx)^m abd^3\log(cx^n)}{fm} + \frac{(fx)^m a^2d^3}{fm}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n))^2,x, algorithm="maxima
")
```

output
```
1/4*b^2*e^3*f^(m - 1)*x^(4*m)*log(c*x^n)^2/m + b^2*d*e^2*f^(m - 1)*x^(3*m)
*log(c*x^n)^2/m + 3/2*b^2*d^2*e*f^(m - 1)*x^(2*m)*log(c*x^n)^2/m + 1/2*a*b
*e^3*f^(m - 1)*x^(4*m)*log(c*x^n)/m + 2*a*b*d*e^2*f^(m - 1)*x^(3*m)*log(c*
x^n)/m + 3*a*b*d^2*e*f^(m - 1)*x^(2*m)*log(c*x^n)/m - 2*(f^(m - 1)*n*x^m*l
og(c*x^n)/m^2 - f^(m - 1)*n^2*x^m/m^3)*b^2*d^3 - 3/4*(2*f^(m - 1)*n*x^(2*m
)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(2*m)/m^3)*b^2*d^2*e - 2/9*(3*f^(m - 1)
*n*x^(3*m)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(3*m)/m^3)*b^2*d*e^2 - 1/32*(4
*f^(m - 1)*n*x^(4*m)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(4*m)/m^3)*b^2*e^3 +
 1/4*a^2*e^3*f^(m - 1)*x^(4*m)/m - 1/8*a*b*e^3*f^(m - 1)*n*x^(4*m)/m^2 + a
^2*d*e^2*f^(m - 1)*x^(3*m)/m - 2/3*a*b*d*e^2*f^(m - 1)*n*x^(3*m)/m^2 + 3/2
*a^2*d^2*e*f^(m - 1)*x^(2*m)/m - 3/2*a*b*d^2*e*f^(m - 1)*n*x^(2*m)/m^2 - 2
*a*b*d^3*f^(m - 1)*n*x^m/m^2 + (f*x)^m*b^2*d^3*log(c*x^n)^2/(f*m) + 2*(f*x
)^m*a*b*d^3*log(c*x^n)/(f*m) + (f*x)^m*a^2*d^3/(f*m)
```

3.359.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 995 vs. $2(354) = 708$.

Time = 0.62 (sec) , antiderivative size = 995, normalized size of antiderivative = 2.67

$$
\begin{aligned}
&\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))^2\,dx \\
&= \frac{b^2e^3f^mn^2x^{4m}\log(x)^2}{4fm} + \frac{b^2de^2f^mn^2x^{3m}\log(x)^2}{fm} + \frac{3b^2d^2ef^mn^2x^{2m}\log(x)^2}{2fm} \\
&+ \frac{b^2d^3f^mn^2x^m\log(x)^2}{fm} + \frac{b^2e^3f^mnx^{4m}\log(c)\log(x)}{2fm} + \frac{2b^2de^2f^mnx^{3m}\log(c)\log(x)}{fm} \\
&+ \frac{3b^2d^2ef^mnx^{2m}\log(c)\log(x)}{fm} + \frac{2b^2d^3f^mnx^m\log(c)\log(x)}{fm} + \frac{b^2e^3f^mx^{4m}\log(c)^2}{4fm} \\
&+ \frac{b^2de^2f^mx^{3m}\log(c)^2}{fm} + \frac{3b^2d^2ef^mx^{2m}\log(c)^2}{2fm} + \frac{b^2d^3f^mx^m\log(c)^2}{fm} \\
&+ \frac{abe^3f^mnx^{4m}\log(x)}{2fm} - \frac{b^2e^3f^mn^2x^{4m}\log(x)}{8fm^2} + \frac{2abde^2f^mnx^{3m}\log(x)}{fm} \\
&- \frac{2b^2de^2f^mn^2x^{3m}\log(x)}{3fm^2} + \frac{3abd^2ef^mnx^{2m}\log(x)}{fm} - \frac{3b^2d^2ef^mn^2x^{2m}\log(x)}{2fm^2} \\
&+ \frac{2abd^3f^mnx^m\log(x)}{fm} - \frac{2b^2d^3f^mn^2x^m\log(x)}{fm^2} + \frac{abe^3f^mx^{4m}\log(c)}{2fm} \\
&- \frac{b^2e^3f^mnx^{4m}\log(c)}{8fm^2} + \frac{2abde^2f^mx^{3m}\log(c)}{fm} - \frac{2b^2de^2f^mnx^{3m}\log(c)}{3fm^2} \\
&+ \frac{3abd^2ef^mx^{2m}\log(c)}{fm} - \frac{3b^2d^2ef^mnx^{2m}\log(c)}{2fm^2} + \frac{2abd^3f^mx^m\log(c)}{fm} \\
&- \frac{2b^2d^3f^mnx^m\log(c)}{fm^2} + \frac{a^2e^3f^mx^{4m}}{4fm} - \frac{abe^3f^mnx^{4m}}{8fm^2} + \frac{b^2e^3f^mn^2x^{4m}}{32fm^3} \\
&+ \frac{a^2de^2f^mx^{3m}}{fm} - \frac{2abde^2f^mnx^{3m}}{3fm^2} + \frac{2b^2de^2f^mn^2x^{3m}}{9fm^3} + \frac{3a^2d^2ef^mx^{2m}}{2fm} \\
&- \frac{3abd^2ef^mnx^{2m}}{2fm^2} + \frac{3b^2d^2ef^mn^2x^{2m}}{4fm^3} + \frac{a^2d^3f^mx^m}{fm} - \frac{2abd^3f^mnx^m}{fm^2} + \frac{2b^2d^3f^mn^2x^m}{fm^3}
\end{aligned}
$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^3*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/4*b^2*e^3*f^m*n^2*x^(4*m)*log(x)^2/(f*m) + b^2*d*e^2*f^m*n^2*x^(3*m)*log
(x)^2/(f*m) + 3/2*b^2*d^2*e*f^m*n^2*x^(2*m)*log(x)^2/(f*m) + b^2*d^3*f^m*n
^2*x^m*log(x)^2/(f*m) + 1/2*b^2*e^3*f^m*n*x^(4*m)*log(c)*log(x)/(f*m) + 2*
b^2*d*e^2*f^m*n*x^(3*m)*log(c)*log(x)/(f*m) + 3*b^2*d^2*e*f^m*n*x^(2*m)*lo
g(c)*log(x)/(f*m) + 2*b^2*d^3*f^m*n*x^m*log(c)*log(x)/(f*m) + 1/4*b^2*e^3*
f^m*x^(4*m)*log(c)^2/(f*m) + b^2*d*e^2*f^m*x^(3*m)*log(c)^2/(f*m) + 3/2*b^
2*d^2*e*f^m*x^(2*m)*log(c)^2/(f*m) + b^2*d^3*f^m*x^m*log(c)^2/(f*m) + 1/2*
a*b*e^3*f^m*n*x^(4*m)*log(x)/(f*m) - 1/8*b^2*e^3*f^m*n^2*x^(4*m)*log(x)/(f
*m^2) + 2*a*b*d*e^2*f^m*n*x^(3*m)*log(x)/(f*m) - 2/3*b^2*d*e^2*f^m*n^2*x^(
3*m)*log(x)/(f*m^2) + 3*a*b*d^2*e*f^m*n*x^(2*m)*log(x)/(f*m) - 3/2*b^2*d^2
*e*f^m*n^2*x^(2*m)*log(x)/(f*m^2) + 2*a*b*d^3*f^m*n*x^m*log(x)/(f*m) - 2*b
^2*d^3*f^m*n^2*x^m*log(x)/(f*m^2) + 1/2*a*b*e^3*f^m*x^(4*m)*log(c)/(f*m) -
 1/8*b^2*e^3*f^m*n*x^(4*m)*log(c)/(f*m^2) + 2*a*b*d*e^2*f^m*x^(3*m)*log(c)
/(f*m) - 2/3*b^2*d*e^2*f^m*n*x^(3*m)*log(c)/(f*m^2) + 3*a*b*d^2*e*f^m*x^(2
*m)*log(c)/(f*m) - 3/2*b^2*d^2*e*f^m*n*x^(2*m)*log(c)/(f*m^2) + 2*a*b*d^3*
f^m*x^m*log(c)/(f*m) - 2*b^2*d^3*f^m*n*x^m*log(c)/(f*m^2) + 1/4*a^2*e^3*f^
m*x^(4*m)/(f*m) - 1/8*a*b*e^3*f^m*n*x^(4*m)/(f*m^2) + 1/32*b^2*e^3*f^m*n^2
*x^(4*m)/(f*m^3) + a^2*d*e^2*f^m*x^(3*m)/(f*m) - 2/3*a*b*d*e^2*f^m*n*x^(3*
m)/(f*m^2) + 2/9*b^2*d*e^2*f^m*n^2*x^(3*m)/(f*m^3) + 3/2*a^2*d^2*e*f^m*x^(
2*m)/(f*m) - 3/2*a*b*d^2*e*f^m*n*x^(2*m)/(f*m^2) + 3/4*b^2*d^2*e*f^m*n^...
```

3.359.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m} (d+ex^m)^3 (a+b\log(cx^n))^2 \, dx = \int (f\,x)^{m-1} (d+e\,x^m)^3 (a+b\,\ln(c\,x^n))^2 \, dx$$

input
```
int((f*x)^(m - 1)*(d + e*x^m)^3*(a + b*log(c*x^n))^2,x)
```

output
```
int((f*x)^(m - 1)*(d + e*x^m)^3*(a + b*log(c*x^n))^2, x)
```

3.360 $\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))^2\, dx$

3.360.1 Optimal result

Integrand size = 29, antiderivative size = 298

$$\begin{aligned}
&\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))^2\, dx \\
&= \frac{2b^2d^2n^2x(fx)^{-1+m}}{m^3} + \frac{b^2den^2x^{1+m}(fx)^{-1+m}}{2m^3} + \frac{2b^2e^2n^2x^{1+2m}(fx)^{-1+m}}{27m^3} \\
&\quad + \frac{b^2d^3n^2x^{1-m}(fx)^{-1+m}\log^2(x)}{3em} - \frac{2bd^2nx(fx)^{-1+m}(a+b\log(cx^n))}{m^2} \\
&\quad - \frac{bdenx^{1+m}(fx)^{-1+m}(a+b\log(cx^n))}{m^2} - \frac{2be^2nx^{1+2m}(fx)^{-1+m}(a+b\log(cx^n))}{9m^2} \\
&\quad - \frac{2bd^3nx^{1-m}(fx)^{-1+m}\log(x)(a+b\log(cx^n))}{3em} \\
&\quad + \frac{x^{1-m}(fx)^{-1+m}(d+ex^m)^3(a+b\log(cx^n))^2}{3em}
\end{aligned}$$

output
```
2*b^2*d^2*n^2*x*(f*x)^(-1+m)/m^3+1/2*b^2*d*e*n^2*x^(1+m)*(f*x)^(-1+m)/m^3+
2/27*b^2*e^2*n^2*x^(1+2*m)*(f*x)^(-1+m)/m^3+1/3*b^2*d^3*n^2*x^(1-m)*(f*x)^
(-1+m)*ln(x)^2/e/m-2*b*d^2*n*x*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-b*d*e*n*x^
(1+m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-2/9*b*e^2*n*x^(1+2*m)*(f*x)^(-1+m)*
(a+b*ln(c*x^n))/m^2-2/3*b*d^3*n*x^(1-m)*(f*x)^(-1+m)*ln(x)*(a+b*ln(c*x^n))
/e/m+1/3*x^(1-m)*(f*x)^(-1+m)*(d+e*x^m)^3*(a+b*ln(c*x^n))^2/e/m
```

3.360.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 207, normalized size of antiderivative = 0.69

$$\int (fx)^{-1+m}(d+ex^m)^2(a+b\log(cx^n))^2\,dx$$
$$=\frac{(fx)^m\left(18a^2m^2(3d^2+3dex^m+e^2x^{2m})-6abmn(18d^2+9dex^m+2e^2x^{2m})+b^2n^2(108d^2+27dex^m+4e^2\right.}{}$$

input
```
Integrate[(f*x)^(-1 + m)*(d + e*x^m)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
((f*x)^m*(18*a^2*m^2*(3*d^2 + 3*d*e*x^m + e^2*x^(2*m)) - 6*a*b*m*n*(18*d^2
 + 9*d*e*x^m + 2*e^2*x^(2*m)) + b^2*n^2*(108*d^2 + 27*d*e*x^m + 4*e^2*x^(2
*m)) + 6*b*m*(6*a*m*(3*d^2 + 3*d*e*x^m + e^2*x^(2*m)) - b*n*(18*d^2 + 9*d*
e*x^m + 2*e^2*x^(2*m)))*Log[c*x^n] + 18*b^2*m^2*(3*d^2 + 3*d*e*x^m + e^2*x
^(2*m))*Log[c*x^n]^2))/(54*f*m^3)
```

3.360.3 Rubi [A] (verified)

Time = 0.72 (sec) , antiderivative size = 212, normalized size of antiderivative = 0.71, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.207, Rules used = {2777, 2776, 2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1}(d+ex^m)^2(a+b\log(cx^n))^2\,dx$$

$$\Big\downarrow \text{ 2777}$$

$$x^{1-m}(fx)^{m-1}\int x^{m-1}(ex^m+d)^2(a+b\log(cx^n))^2\,dx$$

$$\Big\downarrow \text{ 2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3(a+b\log(cx^n))^2}{3em}-\frac{2bn\int\frac{(ex^m+d)^3(a+b\log(cx^n))}{x}dx}{3em}\right)$$

$$\Big\downarrow \text{ 2772}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3(a+b\log(cx^n))^2}{3em}-\frac{2bn\left(-bn\int\frac{e(9dex^m+2e^2x^{2m}+18d^2)x^m+6d^3m\log(x)}{6mx}dx+d^3\log(x)\,(a+\right.}{}\right.$$

$\big\downarrow$ 27

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3(a+b\log(cx^n))^2}{3em}-\frac{2bn\left(-\frac{bn\int\frac{e\left(9dex^m+2e^2x^{2m}+18d^2\right)x^m+6d^3m\log(x)}{x}dx}{6m}+d^3\log(x)\,(a+b\log\right.}{}\right.$$

$\big\downarrow$ 2010

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3(a+b\log(cx^n))^2}{3em}-\frac{2bn\left(-\frac{bn\int\left(18d^2ex^{m-1}+9de^2x^{2m-1}+2e^3x^{3m-1}+\frac{6d^3m\log(x)}{x}\right)dx}{6m}+d^3\log(\right.}{}\right.$$

$\big\downarrow$ 2009

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^3(a+b\log(cx^n))^2}{3em}-\frac{2bn\left(d^3\log(x)\,(a+b\log(cx^n))+\frac{3d^2ex^m(a+b\log(cx^n))}{m}+\frac{3de^2x^{2m}(a+}{2m}\right.}{}\right.$$

input
```
Int[(f*x)^(-1 + m)*(d + e*x^m)^2*(a + b*Log[c*x^n])^2,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(((d + e*x^m)^3*(a + b*Log[c*x^n])^2)/(3*e*m) - (
2*b*n*(-1/6*(b*n*((18*d^2*e*x^m)/m + (9*d*e^2*x^(2*m))/(2*m) + (2*e^3*x^(3
*m))/(3*m) + 3*d^3*m*Log[x]^2))/m + (3*d^2*e*x^m*(a + b*Log[c*x^n]))/m + (
3*d*e^2*x^(2*m)*(a + b*Log[c*x^n]))/(2*m) + (e^3*x^(3*m)*(a + b*Log[c*x^n]
))/(3*m) + d^3*Log[x]*(a + b*Log[c*x^n])))/(3*e*m))
```

3.360. $\int (fx)^{-1+m}\left(d+ex^m\right)^2\left(a+b\log\left(cx^n\right)\right)^2\,dx$

3.360.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

3.360. $\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))^2 \, dx$

3.360.4 Maple [A] (verified)

Time = 50.86 (sec) , antiderivative size = 439, normalized size of antiderivative = 1.47

method	result
parallelrisch	$-\frac{-18e^{2}b^{2}(fx)^{m-1}\ln(c\,x^{n})^{2}x^{2m}x\,m^{2}-36x\,x^{2m}\ln(c\,x^{n})(fx)^{m-1}ab\,e^{2}m^{2}+12x\,x^{2m}\ln(c\,x^{n})(fx)^{m-1}b^{2}e^{2}mn-54b^{2}de(fx)^{m}}{}$
risch	Expression too large to display

input
```
int((f*x)^(m-1)*(d+e*x^m)^2*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
-1/54*(-18*e^2*b^2*(f*x)^(m-1)*ln(c*x^n)^2*(x^m)^2*x*m^2-36*x*(x^m)^2*ln(c
*x^n)*(f*x)^(m-1)*a*b*e^2*m^2+12*x*(x^m)^2*ln(c*x^n)*(f*x)^(m-1)*b^2*e^2*m
*n-54*b^2*d*e*(f*x)^(m-1)*ln(c*x^n)^2*x^m*x*m^2-18*x*(x^m)^2*(f*x)^(m-1)*a
^2*e^2*m^2+12*x*(x^m)^2*(f*x)^(m-1)*a*b*e^2*m*n-4*x*(x^m)^2*(f*x)^(m-1)*b^
2*e^2*n^2-108*x*x^m*ln(c*x^n)*(f*x)^(m-1)*a*b*d*e*m^2+54*x*x^m*ln(c*x^n)*(
f*x)^(m-1)*b^2*d*e*m*n-54*b^2*d^2*(f*x)^(m-1)*ln(c*x^n)^2*x*m^2-54*x*x^m*(
f*x)^(m-1)*a^2*d*e*m^2+54*x*x^m*(f*x)^(m-1)*a*b*d*e*m*n-27*x*x^m*(f*x)^(m-
1)*b^2*d*e*n^2-108*x*ln(c*x^n)*(f*x)^(m-1)*a*b*d^2*m^2+108*x*ln(c*x^n)*(f*
x)^(m-1)*b^2*d^2*m*n-54*x*(f*x)^(m-1)*a^2*d^2*m^2+108*x*(f*x)^(m-1)*a*b*d^
2*m*n-108*x*(f*x)^(m-1)*b^2*d^2*n^2)/m^3
```

3.360.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 419, normalized size of antiderivative = 1.41

$$\int (fx)^{-1+m} \left(d+ex^{m}\right)^{2} \left(a+b\log\left(cx^{n}\right)\right)^{2}\,dx$$
$$= \frac{2\left(9\,b^{2}e^{2}m^{2}n^{2}\log\left(x\right)^{2}+9\,b^{2}e^{2}m^{2}\log\left(c\right)^{2}+9\,a^{2}e^{2}m^{2}-6\,abe^{2}mn+2\,b^{2}e^{2}n^{2}+6\left(3\,abe^{2}m^{2}-b^{2}e^{2}mn\right)\log\right.}{}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n))^2,x, algorithm="fricas
")
```

output
```
1/54*(2*(9*b^2*e^2*m^2*n^2*log(x)^2 + 9*b^2*e^2*m^2*log(c)^2 + 9*a^2*e^2*m
^2 - 6*a*b*e^2*m*n + 2*b^2*e^2*n^2 + 6*(3*a*b*e^2*m^2 - b^2*e^2*m*n)*log(c
) + 6*(3*b^2*e^2*m^2*n*log(c) + 3*a*b*e^2*m^2*n - b^2*e^2*m*n^2)*log(x))*f
^(m - 1)*x^(3*m) + 27*(2*b^2*d*e*m^2*n^2*log(x)^2 + 2*b^2*d*e*m^2*log(c)^2
 + 2*a^2*d*e*m^2 - 2*a*b*d*e*m*n + b^2*d*e*n^2 + 2*(2*a*b*d*e*m^2 - b^2*d*
e*m*n)*log(c) + 2*(2*b^2*d*e*m^2*n*log(c) + 2*a*b*d*e*m^2*n - b^2*d*e*m*n^
2)*log(x))*f^(m - 1)*x^(2*m) + 54*(b^2*d^2*m^2*n^2*log(x)^2 + b^2*d^2*m^2*
log(c)^2 + a^2*d^2*m^2 - 2*a*b*d^2*m*n + 2*b^2*d^2*n^2 + 2*(a*b*d^2*m^2 -
b^2*d^2*m*n)*log(c) + 2*(b^2*d^2*m^2*n*log(c) + a*b*d^2*m^2*n - b^2*d^2*m*
n^2)*log(x))*f^(m - 1)*x^m)/m^3
```

3.360.6 Sympy [A] (verification not implemented)

Time = 12.60 (sec) , antiderivative size = 552, normalized size of antiderivative = 1.85

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))^2 \, dx$$
$$= \begin{cases} \frac{a^2d^2x(fx)^{m-1}}{m} + \frac{a^2dexx^m(fx)^{m-1}}{m} + \frac{a^2e^2xx^{2m}(fx)^{m-1}}{3m} + \frac{2abd^2x(fx)^{m-1}\log(cx^n)}{m} - \frac{2abd^2nx(fx)^{m-1}}{m^2} + \frac{2abdexx^m(fx)^{m-1}\log}{m} \\ \frac{(d+e)^2\left(\begin{cases} \frac{a^2\log(cx^n)+ab\log(cx^n)^2+\frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n \neq 0 \\ (a^2+2ab\log(c)+b^2\log(c)^2)\log(x) & \text{otherwise} \end{cases}\right)}{f} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(d+e*x**m)**2*(a+b*ln(c*x**n))**2,x)
```

output
```
Piecewise((a**2*d**2*x*(f*x)**(m - 1)/m + a**2*d*e*x*x**m*(f*x)**(m - 1)/m
 + a**2*e**2*x*x**(2*m)*(f*x)**(m - 1)/(3*m) + 2*a*b*d**2*x*(f*x)**(m - 1)
*log(c*x**n)/m - 2*a*b*d**2*n*x*(f*x)**(m - 1)/m**2 + 2*a*b*d*e*x*x**m*(f*
x)**(m - 1)*log(c*x**n)/m - a*b*d*e*n*x*x**m*(f*x)**(m - 1)/m**2 + 2*a*b*e
**2*x*x**(2*m)*(f*x)**(m - 1)*log(c*x**n)/(3*m) - 2*a*b*e**2*n*x*x**(2*m)*
(f*x)**(m - 1)/(9*m**2) + b**2*d**2*x*(f*x)**(m - 1)*log(c*x**n)**2/m - 2*
b**2*d**2*n*x*(f*x)**(m - 1)*log(c*x**n)/m**2 + 2*b**2*d**2*n**2*x*(f*x)**
(m - 1)/m**3 + b**2*d*e*x*x**m*(f*x)**(m - 1)*log(c*x**n)**2/m - b**2*d*e*
n*x*x**m*(f*x)**(m - 1)*log(c*x**n)/m**2 + b**2*d*e*n**2*x*x**m*(f*x)**(m
- 1)/(2*m**3) + b**2*e**2*x*x**(2*m)*(f*x)**(m - 1)*log(c*x**n)**2/(3*m) -
 2*b**2*e**2*n*x*x**(2*m)*(f*x)**(m - 1)*log(c*x**n)/(9*m**2) + 2*b**2*e**
2*n**2*x*x**(2*m)*(f*x)**(m - 1)/(27*m**3), Ne(m, 0)), ((d + e)**2*Piecewi
se(((a**2*log(c*x**n) + a*b*log(c*x**n)**2 + b**2*log(c*x**n)**3/3)/n, Ne(
n, 0)), ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*log(x), True))/f, True))
```

3.360.7 Maxima [A] (verification not implemented)

Time = 0.23 (sec) , antiderivative size = 417, normalized size of antiderivative = 1.40

$$\int (fx)^{-1+m}(d+ex^m)^2(a+b\log(cx^n))^2\,dx$$
$$= \frac{b^2e^2f^{m-1}x^{3m}\log(cx^n)^2}{3m} + \frac{b^2def^{m-1}x^{2m}\log(cx^n)^2}{m} + \frac{2abe^2f^{m-1}x^{3m}\log(cx^n)}{3m} + \frac{2abdef^{m-1}x^{2m}\log(cx^n)}{m} - 2\left(\frac{f^{m-1}nx^m\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^m}{m^3}\right)b^2d^2 - \frac{1}{2}\left(\frac{2f^{m-1}nx^{2m}\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^{2m}}{m^3}\right)b^2de - \frac{2}{27}\left(\frac{3f^{m-1}nx^{3m}\log(cx^n)}{m^2} - \frac{f^{m-1}n^2x^{3m}}{m^3}\right)b^2e^2 + \frac{a^2e^2f^{m-1}x^{3m}}{3m} - \frac{2abe^2f^{m-1}nx^{3m}}{9m^2} + \frac{a^2def^{m-1}x^{2m}}{m} - \frac{abdef^{m-1}nx^{2m}}{m^2} - \frac{2abd^2f^{m-1}nx^m}{m^2} + \frac{(fx)^m b^2d^2\log(cx^n)^2}{fm} + \frac{2(fx)^m abd^2\log(cx^n)}{fm} + \frac{(fx)^m a^2d^2}{fm}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n))^2,x, algorithm="maxima
")
```

output
```
1/3*b^2*e^2*f^(m - 1)*x^(3*m)*log(c*x^n)^2/m + b^2*d*e*f^(m - 1)*x^(2*m)*l
og(c*x^n)^2/m + 2/3*a*b*e^2*f^(m - 1)*x^(3*m)*log(c*x^n)/m + 2*a*b*d*e*f^(
m - 1)*x^(2*m)*log(c*x^n)/m - 2*(f^(m - 1)*n*x^m*log(c*x^n)/m^2 - f^(m - 1
)*n^2*x^m/m^3)*b^2*d^2 - 1/2*(2*f^(m - 1)*n*x^(2*m)*log(c*x^n)/m^2 - f^(m
- 1)*n^2*x^(2*m)/m^3)*b^2*d*e - 2/27*(3*f^(m - 1)*n*x^(3*m)*log(c*x^n)/m^2
 - f^(m - 1)*n^2*x^(3*m)/m^3)*b^2*e^2 + 1/3*a^2*e^2*f^(m - 1)*x^(3*m)/m -
2/9*a*b*e^2*f^(m - 1)*n*x^(3*m)/m^2 + a^2*d*e*f^(m - 1)*x^(2*m)/m - a*b*d*
e*f^(m - 1)*n*x^(2*m)/m^2 - 2*a*b*d^2*f^(m - 1)*n*x^m/m^2 + (f*x)^m*b^2*d^
2*log(c*x^n)^2/(f*m) + 2*(f*x)^m*a*b*d^2*log(c*x^n)/(f*m) + (f*x)^m*a^2*d^
2/(f*m)
```

3.360.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 715 vs. $2(286) = 572$.

Time = 0.52 (sec) , antiderivative size = 715, normalized size of antiderivative = 2.40

$$\int (fx)^{-1+m}(d+ex^m)^2(a+b\log(cx^n))^2\,dx$$
$$= \frac{b^2e^2f^mn^2x^{3m}\log(x)^2}{3fm} + \frac{b^2def^mn^2x^{2m}\log(x)^2}{fm} + \frac{b^2d^2f^mn^2x^m\log(x)^2}{fm} + \frac{2b^2e^2f^mnx^{3m}\log(c)\log(x)}{3fm} + \frac{2b^2def^mnx^{2m}\log(c)\log(x)}{fm} + \frac{2b^2d^2f^mnx^m\log(c)\log(x)}{fm} + \frac{b^2e^2f^mx^{3m}\log(c)^2}{3fm} + \frac{b^2def^mx^{2m}\log(c)^2}{fm} + \frac{b^2d^2f^mx^m\log(c)^2}{fm} + \frac{2abe^2f^mnx^{3m}\log(x)}{3fm} - \frac{2b^2e^2f^mn^2x^{3m}\log(x)}{9fm^2} + \frac{2abdef^mnx^{2m}\log(x)}{fm} - \frac{b^2def^mn^2x^{2m}\log(x)}{fm^2} + \frac{2abd^2f^mnx^m\log(x)}{fm} - \frac{2b^2d^2f^mn^2x^m\log(x)}{fm^2} + \frac{2abe^2f^mx^{3m}\log(c)}{3fm} - \frac{2b^2e^2f^mnx^{3m}\log(c)}{9fm^2} + \frac{2abdef^mx^{2m}\log(c)}{fm} - \frac{b^2def^mnx^{2m}\log(c)}{fm^2} + \frac{2abd^2f^mx^m\log(c)}{fm} - \frac{2b^2d^2f^mnx^m\log(c)}{fm^2} + \frac{a^2e^2f^mx^{3m}}{3fm} - \frac{2abe^2f^mnx^{3m}}{9fm^2} + \frac{2b^2e^2f^mn^2x^{3m}}{27fm^3} + \frac{a^2def^mx^{2m}}{fm} - \frac{abdef^mnx^{2m}}{fm^2} + \frac{b^2def^mn^2x^{2m}}{2fm^3} + \frac{a^2d^2f^mx^m}{fm} - \frac{2abd^2f^mnx^m}{fm^2} + \frac{2b^2d^2f^mn^2x^m}{fm^3}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)^2*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/3*b^2*e^2*f^m*n^2*x^(3*m)*log(x)^2/(f*m) + b^2*d*e*f^m*n^2*x^(2*m)*log(x
)^2/(f*m) + b^2*d^2*f^m*n^2*x^m*log(x)^2/(f*m) + 2/3*b^2*e^2*f^m*n*x^(3*m)
*log(c)*log(x)/(f*m) + 2*b^2*d*e*f^m*n*x^(2*m)*log(c)*log(x)/(f*m) + 2*b^2
*d^2*f^m*n*x^m*log(c)*log(x)/(f*m) + 1/3*b^2*e^2*f^m*x^(3*m)*log(c)^2/(f*m
) + b^2*d*e*f^m*x^(2*m)*log(c)^2/(f*m) + b^2*d^2*f^m*x^m*log(c)^2/(f*m) +
2/3*a*b*e^2*f^m*n*x^(3*m)*log(x)/(f*m) - 2/9*b^2*e^2*f^m*n^2*x^(3*m)*log(x
)/(f*m^2) + 2*a*b*d*e*f^m*n*x^(2*m)*log(x)/(f*m) - b^2*d*e*f^m*n^2*x^(2*m)
*log(x)/(f*m^2) + 2*a*b*d^2*f^m*n*x^m*log(x)/(f*m) - 2*b^2*d^2*f^m*n^2*x^m
*log(x)/(f*m^2) + 2/3*a*b*e^2*f^m*x^(3*m)*log(c)/(f*m) - 2/9*b^2*e^2*f^m*n
*x^(3*m)*log(c)/(f*m^2) + 2*a*b*d*e*f^m*x^(2*m)*log(c)/(f*m) - b^2*d*e*f^m
*n*x^(2*m)*log(c)/(f*m^2) + 2*a*b*d^2*f^m*x^m*log(c)/(f*m) - 2*b^2*d^2*f^m
*n*x^m*log(c)/(f*m^2) + 1/3*a^2*e^2*f^m*x^(3*m)/(f*m) - 2/9*a*b*e^2*f^m*n*
x^(3*m)/(f*m^2) + 2/27*b^2*e^2*f^m*n^2*x^(3*m)/(f*m^3) + a^2*d*e*f^m*x^(2*
m)/(f*m) - a*b*d*e*f^m*n*x^(2*m)/(f*m^2) + 1/2*b^2*d*e*f^m*n^2*x^(2*m)/(f*
m^3) + a^2*d^2*f^m*x^m/(f*m) - 2*a*b*d^2*f^m*n*x^m/(f*m^2) + 2*b^2*d^2*f^m
*n^2*x^m/(f*m^3)
```

3.360.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m} (d+ex^m)^2 (a+b\log(cx^n))^2 \, dx = \int (f\,x)^{m-1} (d+e\,x^m)^2 (a+b\,\ln(c\,x^n))^2 \, dx$$

input
```
int((f*x)^(m - 1)*(d + e*x^m)^2*(a + b*log(c*x^n))^2,x)
```

output
```
int((f*x)^(m - 1)*(d + e*x^m)^2*(a + b*log(c*x^n))^2, x)
```

3.361 $\int (fx)^{-1+m} (d + ex^m) (a + b \log (cx^n))^2 \, dx$

3.361.1 Optimal result

Integrand size = 27, antiderivative size = 226

$$\begin{aligned}\int (fx)^{-1+m} (d + ex^m) (a + b \log (cx^n))^2 \, dx = {} & \frac{2b^2dn^2x(fx)^{-1+m}}{m^3} + \frac{b^2en^2x^{1+m}(fx)^{-1+m}}{4m^3} \\ & + \frac{b^2d^2n^2x^{1-m}(fx)^{-1+m}\log^2(x)}{2em} \\ & - \frac{2bdnx(fx)^{-1+m}(a + b\log(cx^n))}{m^2} \\ & - \frac{benx^{1+m}(fx)^{-1+m}(a + b\log(cx^n))}{2m^2} \\ & - \frac{bd^2nx^{1-m}(fx)^{-1+m}\log(x)(a + b\log(cx^n))}{em} \\ & + \frac{x^{1-m}(fx)^{-1+m}(d + ex^m)^2(a + b\log(cx^n))^2}{2em}\end{aligned}$$

output
```
2*b^2*d*n^2*x*(f*x)^(-1+m)/m^3+1/4*b^2*e*n^2*x^(1+m)*(f*x)^(-1+m)/m^3+1/2*
b^2*d^2*n^2*x^(1-m)*(f*x)^(-1+m)*ln(x)^2/e/m-2*b*d*n*x*(f*x)^(-1+m)*(a+b*l
n(c*x^n))/m^2-1/2*b*e*n*x^(1+m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/m^2-b*d^2*n*x
^(1-m)*(f*x)^(-1+m)*ln(x)*(a+b*ln(c*x^n))/e/m+1/2*x^(1-m)*(f*x)^(-1+m)*(d+
e*x^m)^2*(a+b*ln(c*x^n))^2/e/m
```

3.361.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.55

$$\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))^2\,dx$$
$$=\frac{(fx)^m\left(2a^2m^2(2d+ex^m)-2abmn(4d+ex^m)+b^2n^2(8d+ex^m)-2bm(-2am(2d+ex^m)+bn(4d+ex^{m}\right.}{4fm^3}$$

input
```
Integrate[(f*x)^(-1 + m)*(d + e*x^m)*(a + b*Log[c*x^n])^2,x]
```

output
```
((f*x)^m*(2*a^2*m^2*(2*d + e*x^m) - 2*a*b*m*n*(4*d + e*x^m) + b^2*n^2*(8*d
 + e*x^m) - 2*b*m*(-2*a*m*(2*d + e*x^m) + b*n*(4*d + e*x^m))*Log[c*x^n] +
2*b^2*m^2*(2*d + e*x^m)*Log[c*x^n]^2))/(4*f*m^3)
```

3.361.3 Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 163, normalized size of antiderivative = 0.72, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$, Rules used = {2777, 2776, 2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1}(d+ex^m)(a+b\log(cx^n))^2\,dx$$

$$\Big\downarrow \text{2777}$$

$$x^{1-m}(fx)^{m-1}\int x^{m-1}(ex^m+d)(a+b\log(cx^n))^2dx$$

$$\Big\downarrow \text{2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2(a+b\log(cx^n))^2}{2em}-\frac{bn\int\frac{(ex^m+d)^2(a+b\log(cx^n))}{x}dx}{em}\right)$$

$$\Big\downarrow \text{2772}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2(a+b\log(cx^n))^2}{2em}-\frac{bn\left(-bn\int\frac{e(ex^m+4d)x^m+2d^2m\log(x)}{2mx}dx+d^2\log(x)(a+b\log(cx^n))\right.}{em}\right.$$

$$\Big\downarrow \text{27}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2(a+b\log(cx^n))^2}{2em}-\frac{bn\left(-\frac{bn\int\frac{e(ex^m+4d)x^m+2d^2m\log(x)}{x}dx}{2m}+d^2\log(x)(a+b\log(cx^n))+\right.}{em}\right.$$

$\downarrow$ 2010

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2(a+b\log(cx^n))^2}{2em}-\frac{bn\left(-\frac{bn\int\left(4dex^{m-1}+e^2x^{2m-1}+\frac{2d^2m\log(x)}{x}\right)dx}{2m}+d^2\log(x)(a+b\log(c\right.}{em}\right.$$

$\downarrow$ 2009

$$x^{1-m}(fx)^{m-1}\left(\frac{(d+ex^m)^2(a+b\log(cx^n))^2}{2em}-\frac{bn\left(d^2\log(x)(a+b\log(cx^n))+\frac{2dex^m(a+b\log(cx^n))}{m}+\frac{e^2x^{2m}(a+b\log\right.}{em}\right.$$

input
```
Int[(f*x)^(-1 + m)*(d + e*x^m)*(a + b*Log[c*x^n])^2,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(((d + e*x^m)^2*(a + b*Log[c*x^n])^2)/(2*e*m) - (
b*n*(-1/2*(b*n*((4*d*e*x^m)/m + (e^2*x^(2*m))/(2*m) + d^2*m*Log[x]^2))/m +
 (2*d*e*x^m*(a + b*Log[c*x^n]))/m + (e^2*x^(2*m)*(a + b*Log[c*x^n]))/(2*m)
 + d^2*Log[x]*(a + b*Log[c*x^n])))/(e*m))
```

3.361.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

3.361. $\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))^2\,dx$

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

3.361.4 Maple [A] (verified)

Time = 10.75 (sec) , antiderivative size = 261, normalized size of antiderivative = 1.15

method	result
parallelrisch	$-\frac{-2e\,b^{2}(fx)^{m-1}\ln(c\,x^{n})^{2}x^{m}x\,m^{2}-4x\,x^{m}\ln(c\,x^{n})(fx)^{m-1}abe\,m^{2}+2x\,x^{m}\ln(c\,x^{n})(fx)^{m-1}b^{2}emn-4b^{2}d(fx)^{m-1}\ln(c\,x^{n})^{2}}{}$
risch	Expression too large to display

input
```
int((f*x)^(m-1)*(d+e*x^m)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-2*e*b^2*(f*x)^(m-1)*ln(c*x^n)^2*x^m*x*m^2-4*x*x^m*ln(c*x^n)*(f*x)^(
m-1)*a*b*e*m^2+2*x*x^m*ln(c*x^n)*(f*x)^(m-1)*b^2*e*m*n-4*b^2*d*(f*x)^(m-1)
*ln(c*x^n)^2*x*m^2-2*x*x^m*(f*x)^(m-1)*a^2*e*m^2+2*x*x^m*(f*x)^(m-1)*a*b*e
*m*n-x*x^m*(f*x)^(m-1)*b^2*e*n^2-8*x*ln(c*x^n)*(f*x)^(m-1)*a*b*d*m^2+8*x*l
n(c*x^n)*(f*x)^(m-1)*b^2*d*m*n-4*x*(f*x)^(m-1)*a^2*d*m^2+8*x*(f*x)^(m-1)*a
*b*d*m*n-8*x*(f*x)^(m-1)*b^2*d*n^2)/m^3
```

3.361.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 244, normalized size of antiderivative = 1.08

$$\int (fx)^{-1+m} (d+ex^m) (a+b\log(cx^n))^2 \, dx$$
$$= \frac{\left(2\,b^2em^2n^2\log(x)^2 + 2\,b^2em^2\log(c)^2 + 2\,a^2em^2 - 2\,abemn + b^2en^2 + 2\,(2\,abem^2 - b^2emn)\log(c) + 2\,(2\right.}{}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
1/4*((2*b^2*e*m^2*n^2*log(x)^2 + 2*b^2*e*m^2*log(c)^2 + 2*a^2*e*m^2 - 2*a*
b*e*m*n + b^2*e*n^2 + 2*(2*a*b*e*m^2 - b^2*e*m*n)*log(c) + 2*(2*b^2*e*m^2*
n*log(c) + 2*a*b*e*m^2*n - b^2*e*m*n^2)*log(x))*f^(m - 1)*x^(2*m) + 4*(b^2
*d*m^2*n^2*log(x)^2 + b^2*d*m^2*log(c)^2 + a^2*d*m^2 - 2*a*b*d*m*n + 2*b^2
*d*n^2 + 2*(a*b*d*m^2 - b^2*d*m*n)*log(c) + 2*(b^2*d*m^2*n*log(c) + a*b*d*
m^2*n - b^2*d*m*n^2)*log(x))*f^(m - 1)*x^m)/m^3
```

3.361.6 Sympy [A] (verification not implemented)

Time = 9.28 (sec) , antiderivative size = 352, normalized size of antiderivative = 1.56

$$\int (fx)^{-1+m} (d+ex^m) (a+b\log(cx^n))^2 \, dx$$
$$= \begin{cases} \frac{a^2dx(fx)^{m-1}}{m} + \frac{a^2exx^m(fx)^{m-1}}{2m} + \frac{2abdx(fx)^{m-1}\log(cx^n)}{m} - \frac{2abdnx(fx)^{m-1}}{m^2} + \frac{abexx^m(fx)^{m-1}\log(cx^n)}{m} - \frac{abenxx^m(fx)^{m-1}}{2m^2} \\ \frac{(d+e)\left(\begin{cases} \frac{a^2\log(cx^n)+ab\log(cx^n)^2+\frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n \neq 0 \\ \left(a^2+2ab\log(c)+b^2\log(c)^2\right)\log(x) & \text{otherwise} \end{cases}\right)}{f} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(d+e*x**m)*(a+b*ln(c*x**n))**2,x)
```

output
```
Piecewise((a**2*d*x*(f*x)**(m - 1)/m + a**2*e*x*x**m*(f*x)**(m - 1)/(2*m)
+ 2*a*b*d*x*(f*x)**(m - 1)*log(c*x**n)/m - 2*a*b*d*n*x*(f*x)**(m - 1)/m**2
 + a*b*e*x*x**m*(f*x)**(m - 1)*log(c*x**n)/m - a*b*e*n*x*x**m*(f*x)**(m -
1)/(2*m**2) + b**2*d*x*(f*x)**(m - 1)*log(c*x**n)**2/m - 2*b**2*d*n*x*(f*x
)**(m - 1)*log(c*x**n)/m**2 + 2*b**2*d*n**2*x*(f*x)**(m - 1)/m**3 + b**2*e
*x*x**m*(f*x)**(m - 1)*log(c*x**n)**2/(2*m) - b**2*e*n*x*x**m*(f*x)**(m -
1)*log(c*x**n)/(2*m**2) + b**2*e*n**2*x*x**m*(f*x)**(m - 1)/(4*m**3), Ne(m
, 0)), ((d + e)*Piecewise(((a**2*log(c*x**n) + a*b*log(c*x**n)**2 + b**2*l
og(c*x**n)**3/3)/n, Ne(n, 0)), ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*log
(x), True))/f, True))
```

3.361.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 257, normalized size of antiderivative = 1.14

$$\begin{aligned}\int (fx)^{-1+m}\left(d+ex^m\right)\left(a+b\log\left(cx^n\right)\right)^2\,dx &= \frac{b^2ef^{m-1}x^{2\,m}\log\left(cx^n\right)^2}{2\,m}+\frac{abef^{m-1}x^{2\,m}\log\left(cx^n\right)}{m}\\&\quad-2\left(\frac{f^{m-1}nx^m\log\left(cx^n\right)}{m^2}-\frac{f^{m-1}n^2x^m}{m^3}\right)b^2d\\&\quad-\frac{1}{4}\left(\frac{2\,f^{m-1}nx^{2\,m}\log\left(cx^n\right)}{m^2}-\frac{f^{m-1}n^2x^{2\,m}}{m^3}\right)b^2e+\frac{a^2ef^{m-1}x^{2\,m}}{2\,m}-\frac{abef^{m-1}nx^{2\,m}}{2\,m^2}\\&\quad-\frac{2\,abdf^{m-1}nx^m}{m^2}+\frac{(fx)^m\,b^2d\log\left(cx^n\right)^2}{fm}+\frac{2\,(fx)^m\,abd\log\left(cx^n\right)}{fm}+\frac{(fx)^m\,a^2d}{fm}\end{aligned}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
1/2*b^2*e*f^(m - 1)*x^(2*m)*log(c*x^n)^2/m + a*b*e*f^(m - 1)*x^(2*m)*log(c
*x^n)/m - 2*(f^(m - 1)*n*x^m*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^m/m^3)*b^2*d
 - 1/4*(2*f^(m - 1)*n*x^(2*m)*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^(2*m)/m^3)*
b^2*e + 1/2*a^2*e*f^(m - 1)*x^(2*m)/m - 1/2*a*b*e*f^(m - 1)*n*x^(2*m)/m^2
- 2*a*b*d*f^(m - 1)*n*x^m/m^2 + (f*x)^m*b^2*d*log(c*x^n)^2/(f*m) + 2*(f*x)
^m*a*b*d*log(c*x^n)/(f*m) + (f*x)^m*a^2*d/(f*m)
```

3.361.8 Giac [A] (verification not implemented)

Time = 0.45 (sec) , antiderivative size = 435, normalized size of antiderivative = 1.92

$$\int (fx)^{-1+m}(d+ex^m)(a+b\log(cx^n))^2\,dx = \frac{b^2ef^mn^2x^{2m}\log(x)^2}{2fm} + \frac{b^2df^mn^2x^m\log(x)^2}{fm} + \frac{b^2ef^mnx^{2m}\log(c)\log(x)}{fm} + \frac{2b^2df^mnx^m\log(c)\log(x)}{fm} + \frac{b^2ef^mx^{2m}\log(c)^2}{2fm} + \frac{b^2df^mx^m\log(c)^2}{fm} + \frac{abef^mnx^{2m}\log(x)}{fm} - \frac{b^2ef^mn^2x^{2m}\log(x)}{2fm^2} + \frac{2abdf^mnx^m\log(x)}{fm} - \frac{2b^2df^mn^2x^m\log(x)}{fm^2} + \frac{abef^mx^{2m}\log(c)}{fm} - \frac{b^2ef^mnx^{2m}\log(c)}{2fm^2} + \frac{2abdf^mx^m\log(c)}{fm} - \frac{2b^2df^mnx^m\log(c)}{fm^2} + \frac{a^2ef^mx^{2m}}{2fm} - \frac{abef^mnx^{2m}}{2fm^2} + \frac{b^2ef^mn^2x^{2m}}{4fm^3} + \frac{a^2df^mx^m}{fm} - \frac{2abdf^mnx^m}{fm^2} + \frac{2b^2df^mn^2x^m}{fm^3}$$

input
```
integrate((f*x)^(-1+m)*(d+e*x^m)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
1/2*b^2*e*f^m*n^2*x^(2*m)*log(x)^2/(f*m) + b^2*d*f^m*n^2*x^m*log(x)^2/(f*m
) + b^2*e*f^m*n*x^(2*m)*log(c)*log(x)/(f*m) + 2*b^2*d*f^m*n*x^m*log(c)*log
(x)/(f*m) + 1/2*b^2*e*f^m*x^(2*m)*log(c)^2/(f*m) + b^2*d*f^m*x^m*log(c)^2/
(f*m) + a*b*e*f^m*n*x^(2*m)*log(x)/(f*m) - 1/2*b^2*e*f^m*n^2*x^(2*m)*log(x
)/(f*m^2) + 2*a*b*d*f^m*n*x^m*log(x)/(f*m) - 2*b^2*d*f^m*n^2*x^m*log(x)/(f
*m^2) + a*b*e*f^m*x^(2*m)*log(c)/(f*m) - 1/2*b^2*e*f^m*n*x^(2*m)*log(c)/(f
*m^2) + 2*a*b*d*f^m*x^m*log(c)/(f*m) - 2*b^2*d*f^m*n*x^m*log(c)/(f*m^2) +
1/2*a^2*e*f^m*x^(2*m)/(f*m) - 1/2*a*b*e*f^m*n*x^(2*m)/(f*m^2) + 1/4*b^2*e*
f^m*n^2*x^(2*m)/(f*m^3) + a^2*d*f^m*x^m/(f*m) - 2*a*b*d*f^m*n*x^m/(f*m^2)
+ 2*b^2*d*f^m*n^2*x^m/(f*m^3)
```

3.361.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m} (d + ex^m) (a + b\log(cx^n))^2 \, dx = \int (f\,x)^{m-1} (d + e\,x^m) \left(a + b\,\ln(c\,x^n)\right)^2 dx$$

input
```
int((f*x)^(m - 1)*(d + e*x^m)*(a + b*log(c*x^n))^2,x)
```

output
```
int((f*x)^(m - 1)*(d + e*x^m)*(a + b*log(c*x^n))^2, x)
```

3.362 $\int (fx)^{-1+m} (a + b\log (cx^n))^2 \, dx$

3.362.1 Optimal result

Integrand size = 20, antiderivative size = 69

$$\int (fx)^{-1+m} (a + b\log (cx^n))^2 \, dx = \frac{2b^2n^2(fx)^m}{fm^3} - \frac{2bn(fx)^m (a + b\log (cx^n))}{fm^2} + \frac{(fx)^m (a + b\log (cx^n))^2}{fm}$$

output
```
2*b^2*n^2*(f*x)^m/f/m^3-2*b*n*(f*x)^m*(a+b*ln(c*x^n))/f/m^2+(f*x)^m*(a+b*l
n(c*x^n))^2/f/m
```

3.362.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 67, normalized size of antiderivative = 0.97

$$\int (fx)^{-1+m} (a + b\log (cx^n))^2 \, dx = \frac{(fx)^m (a^2m^2 - 2abmn + 2b^2n^2 + 2bm(am - bn)\log (cx^n) + b^2m^2\log^2 (cx^n))}{fm^3}$$

input
```
Integrate[(f*x)^(-1 + m)*(a + b*Log[c*x^n])^2,x]
```

output
```
((f*x)^m*(a^2*m^2 - 2*a*b*m*n + 2*b^2*n^2 + 2*b*m*(a*m - b*n)*Log[c*x^n] +
 b^2*m^2*Log[c*x^n]^2))/(f*m^3)
```

3.362.3 Rubi [A] (verified)

Time = 0.25 (sec) , antiderivative size = 70, normalized size of antiderivative = 1.01, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2742, 2741}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{m-1} (a+b\log(cx^n))^2 \, dx$$

$$\Big\downarrow \text{2742}$$

$$\frac{(fx)^m (a+b\log(cx^n))^2}{fm}-\frac{2bn\int (fx)^{m-1} (a+b\log(cx^n))dx}{m}$$

$$\Big\downarrow \text{2741}$$

$$\frac{(fx)^m (a+b\log(cx^n))^2}{fm}-\frac{2bn\left(\frac{(fx)^m(a+b\log(cx^n))}{fm}-\frac{bn(fx)^m}{fm^2}\right)}{m}$$

input
```
Int[(f*x)^(-1 + m)*(a + b*Log[c*x^n])^2,x]
```

output
```
((f*x)^m*(a + b*Log[c*x^n])^2)/(f*m) - (2*b*n*(-((b*n*(f*x)^m)/(f*m^2)) +
((f*x)^m*(a + b*Log[c*x^n]))/(f*m)))/m
```

3.362.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

rule 2742
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_.)*(x_))^(m_.), x_Symbo
l] :> Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])^p/(d*(m + 1))), x] - Simp[b*n*
(p/(m + 1))   Int[(d*x)^m*(a + b*Log[c*x^n])^(p - 1), x], x] /; FreeQ[{a, b
, c, d, m, n}, x] && NeQ[m, -1] && GtQ[p, 0]
```

3.362.4 Maple [A] (verified)

Time = 0.39 (sec) , antiderivative size = 119, normalized size of antiderivative = 1.72

method	result
parallelrisch	$-\frac{-x \ln(c\,x^{n})^{2} (fx)^{m-1} b^{2} m^{2}-2 x \ln(c\,x^{n}) (fx)^{m-1} a b\, m^{2}+2 x \ln(c\,x^{n}) (fx)^{m-1} b^{2} m n-x (fx)^{m-1} a^{2} m^{2}+2 x (fx)^{m-1} a b m n-2}{m^{3}}$
risch	Expression too large to display

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2,x,method=_RETURNVERBOSE)
```

output
```
-(-x*ln(c*x^n)^2*(f*x)^(m-1)*b^2*m^2-2*x*ln(c*x^n)*(f*x)^(m-1)*a*b*m^2+2*x
*ln(c*x^n)*(f*x)^(m-1)*b^2*m*n-x*(f*x)^(m-1)*a^2*m^2+2*x*(f*x)^(m-1)*a*b*m
*n-2*x*(f*x)^(m-1)*b^2*n^2)/m^3
```

3.362.5 Fricas [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.80

$$\int (fx)^{-1+m} \left(a+b\log\left(cx^{n}\right)\right)^{2}\,dx$$
$$= \frac{\left(b^{2}m^{2}n^{2}x\log\left(x\right)^{2}+b^{2}m^{2}x\log\left(c\right)^{2}+2\left(abm^{2}-b^{2}mn\right)x\log\left(c\right)+\left(a^{2}m^{2}-2\,abmn+2\,b^{2}n^{2}\right)x+2\left(b^{2}m^{2}n\right.\right.}{m^{3}}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2,x, algorithm="fricas")
```

output
```
(b^2*m^2*n^2*x*log(x)^2 + b^2*m^2*x*log(c)^2 + 2*(a*b*m^2 - b^2*m*n)*x*log
(c) + (a^2*m^2 - 2*a*b*m*n + 2*b^2*n^2)*x + 2*(b^2*m^2*n*x*log(c) + (a*b*m
^2*n - b^2*m*n^2)*x)*log(x))*e^((m - 1)*log(f) + (m - 1)*log(x))/m^3
```

3.362.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 184 vs. 2(63) = 126.

Time = 6.77 (sec) , antiderivative size = 184, normalized size of antiderivative = 2.67

$$\int (fx)^{-1+m} (a + b \log (cx^n))^2 \, dx = \begin{cases} \frac{a^2 x (fx)^{m-1}}{m} + \frac{2abx (fx)^{m-1} \log (cx^n)}{m} - \frac{2abnx (fx)^{m-1}}{m^2} + \frac{b^2 x (fx)^{m-1} \log (cx^n)^2}{m} - \frac{2b^2 nx (fx)^{m-1} \log (cx^n)}{m^2} + \frac{2b^2 n^2 x (fx)^{m-1}}{m^3} \\ \frac{\begin{cases} \frac{a^2 \log (cx^n) + ab \log (cx^n)^2 + \frac{b^2 \log (cx^n)^3}{3}}{n} & \text{for } n \neq 0 \\ (a^2 + 2ab \log (c) + b^2 \log (c)^2) \log (x) & \text{otherwise} \end{cases}}{f} \end{cases}$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2,x)
```

output
```
Piecewise((a**2*x*(f*x)**(m - 1)/m + 2*a*b*x*(f*x)**(m - 1)*log(c*x**n)/m
- 2*a*b*n*x*(f*x)**(m - 1)/m**2 + b**2*x*(f*x)**(m - 1)*log(c*x**n)**2/m -
 2*b**2*n*x*(f*x)**(m - 1)*log(c*x**n)/m**2 + 2*b**2*n**2*x*(f*x)**(m - 1)
/m**3, Ne(m, 0)), (Piecewise(((a**2*log(c*x**n) + a*b*log(c*x**n)**2 + b**
2*log(c*x**n)**3/3)/n, Ne(n, 0)), ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*
log(x), True))/f, True))
```

3.362.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 117, normalized size of antiderivative = 1.70

$$\int (fx)^{-1+m} (a+b \log (cx^n))^2 \, dx = -2 \left(\frac{f^{m-1} n x^m \log (cx^n)}{m^2} - \frac{f^{m-1} n^2 x^m}{m^3} \right) b^2 - \frac{2 \, ab f^{m-1} n x^m}{m^2} + \frac{(fx)^m b^2 \log (cx^n)^2}{fm} + \frac{2 (fx)^m ab \log (cx^n)}{fm} + \frac{(fx)^m a^2}{fm}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2,x, algorithm="maxima")
```

output
```
-2*(f^(m - 1)*n*x^m*log(c*x^n)/m^2 - f^(m - 1)*n^2*x^m/m^3)*b^2 - 2*a*b*f^
(m - 1)*n*x^m/m^2 + (f*x)^m*b^2*log(c*x^n)^2/(f*m) + 2*(f*x)^m*a*b*log(c*x
^n)/(f*m) + (f*x)^m*a^2/(f*m)
```

3.362.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 198 vs. $2(69) = 138$.

Time = 0.42 (sec) , antiderivative size = 198, normalized size of antiderivative = 2.87

$$\int (fx)^{-1+m}(a+b\log(cx^n))^2\,dx = \frac{b^2f^mn^2x^m\log(x)^2}{fm} + \frac{2\,b^2f^mnx^m\log(c)\log(x)}{fm} + \frac{b^2f^mx^m\log(c)^2}{fm} + \frac{2\,abf^mnx^m\log(x)}{fm} - \frac{2\,b^2f^mn^2x^m\log(x)}{fm^2} + \frac{2\,abf^mx^m\log(c)}{fm} - \frac{2\,b^2f^mnx^m\log(c)}{fm^2} + \frac{a^2f^mx^m}{fm} - \frac{2\,abf^mnx^m}{fm^2} + \frac{2\,b^2f^mn^2x^m}{fm^3}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2,x, algorithm="giac")
```

output
```
b^2*f^m*n^2*x^m*log(x)^2/(f*m) + 2*b^2*f^m*n*x^m*log(c)*log(x)/(f*m) + b^2
*f^m*x^m*log(c)^2/(f*m) + 2*a*b*f^m*n*x^m*log(x)/(f*m) - 2*b^2*f^m*n^2*x^m
*log(x)/(f*m^2) + 2*a*b*f^m*x^m*log(c)/(f*m) - 2*b^2*f^m*n*x^m*log(c)/(f*m
^2) + a^2*f^m*x^m/(f*m) - 2*a*b*f^m*n*x^m/(f*m^2) + 2*b^2*f^m*n^2*x^m/(f*m
^3)
```

3.362.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1+m}(a+b\log(cx^n))^2\,dx = \int (f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))^2\,dx$$

input
```
int((f*x)^(m - 1)*(a + b*log(c*x^n))^2,x)
```

output
```
int((f*x)^(m - 1)*(a + b*log(c*x^n))^2, x)
```

3.363 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx$

3.363.1 Optimal result

Integrand size = 29, antiderivative size = 129

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx = \frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))^2\log\left(1+\frac{ex^m}{d}\right)}{em} + \frac{2bnx^{1-m}(fx)^{-1+m}(a+b\log(cx^n))\,\mathrm{PolyLog}\left(2,-\frac{ex^m}{d}\right)}{em^2} - \frac{2b^2n^2x^{1-m}(fx)^{-1+m}\,\mathrm{PolyLog}\left(3,-\frac{ex^m}{d}\right)}{em^3}$$

output
```
x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))^2*ln(1+e*x^m/d)/e/m+2*b*n*x^(1-m)*(f*
x)^(-1+m)*(a+b*ln(c*x^n))*polylog(2,-e*x^m/d)/e/m^2-2*b^2*n^2*x^(1-m)*(f*x
)^(-1+m)*polylog(3,-e*x^m/d)/e/m^3
```

3.363.2 Mathematica [B] (warning: unable to verify)

Leaf count is larger than twice the leaf count of optimal. 502 vs. 2(129) = 258.

Time = 0.40 (sec) , antiderivative size = 502, normalized size of antiderivative = 3.89

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx = \frac{x^{-m}(fx)^m\left(3a^2m^3\log(x) - 6abm^3n\log^2(x) + 4b^2m^3n^2\log^3(x) + 6abm^3\log(x)\log(cx^n) - 6b^2m^3n\log^2(x\right.}{}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m),x]
```

output
```
((f*x)^m*(3*a^2*m^3*Log[x] - 6*a*b*m^3*n*Log[x]^2 + 4*b^2*m^3*n^2*Log[x]^3
 + 6*a*b*m^3*Log[x]*Log[c*x^n] - 6*b^2*m^3*n*Log[x]^2*Log[c*x^n] + 3*b^2*m
^3*Log[x]*Log[c*x^n]^2 + 3*b^2*m^2*n^2*Log[x]^2*Log[1 + d/(e*x^m)] + 3*a^2
*m^2*Log[d - d*x^m] - 6*a*b*m^2*n*Log[x]*Log[d - d*x^m] + 3*b^2*m^2*n^2*Lo
g[x]^2*Log[d - d*x^m] + 6*a*b*m^2*Log[c*x^n]*Log[d - d*x^m] - 6*b^2*m^2*n*
Log[x]*Log[c*x^n]*Log[d - d*x^m] + 3*b^2*m^2*Log[c*x^n]^2*Log[d - d*x^m] +
 6*a*b*m^2*n*Log[x]*Log[d + e*x^m] - 6*b^2*m^2*n^2*Log[x]^2*Log[d + e*x^m]
 - 6*a*b*m*n*Log[-((e*x^m)/d)]*Log[d + e*x^m] + 6*b^2*m*n^2*Log[x]*Log[-((
e*x^m)/d)]*Log[d + e*x^m] + 6*b^2*m^2*n*Log[x]*Log[c*x^n]*Log[d + e*x^m] -
 6*b^2*m*n*Log[-((e*x^m)/d)]*Log[c*x^n]*Log[d + e*x^m] - 6*b^2*m*n^2*Log[x
]*PolyLog[2, -(d/(e*x^m))] - 6*b*m*n*(a - b*n*Log[x] + b*Log[c*x^n])*PolyL
og[2, 1 + (e*x^m)/d] - 6*b^2*n^2*PolyLog[3, -(d/(e*x^m))]))/(3*e*f*m^3*x^m
)
```

3.363.3 Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 100, normalized size of antiderivative = 0.78, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.138, Rules used = {2777, 2775, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}(a+b\log(cx^n))^2}{d+ex^m}dx$$

$$\Big\downarrow \text{2777}$$

$$x^{1-m}(fx)^{m-1}\int \frac{x^{m-1}(a+b\log(cx^n))^2}{ex^m+d}dx$$

$$\Big\downarrow \text{2775}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{\log\left(\frac{ex^m}{d}+1\right)(a+b\log(cx^n))^2}{em}-\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{ex^m}{d}+1\right)}{x}dx}{em}\right)$$

$$\Big\downarrow \text{2821}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{\log\left(\frac{ex^m}{d}+1\right)(a+b\log(cx^n))^2}{em}-\frac{2bn\left(\frac{bn\int\frac{\text{PolyLog}\left(2,-\frac{ex^m}{d}\right)}{x}dx}{m}-\frac{\text{PolyLog}\left(2,-\frac{ex^m}{d}\right)(a+b\log(cx^n))}{m}\right)}{em}\right)$$

$$\Big\downarrow \; 7143$$

$$x^{1-m}(fx)^{m-1}\left(\frac{\log\left(\frac{ex^m}{d}+1\right)(a+b\log(cx^n))^2}{em}-\frac{2bn\left(\frac{bn\,\text{PolyLog}\left(3,-\frac{ex^m}{d}\right)}{m^2}-\frac{\text{PolyLog}\left(2,-\frac{ex^m}{d}\right)(a+b\log(cx^n))}{m}\right)}{em}\right)$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m),x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(((a + b*Log[c*x^n])^2*Log[1 + (e*x^m)/d])/(e*m)
- (2*b*n*(-(((a + b*Log[c*x^n])*PolyLog[2, -((e*x^m)/d)])/m) + (b*n*PolyLo
g[3, -((e*x^m)/d)])/m^2))/(e*m))
```

3.363.3.1 Defintions of rubi rules used

rule 2775
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.))/((d_)
+ (e_.)*(x_)^(r_)), x_Symbol] :> Simp[f^m*Log[1 + e*(x^r/d)]*((a + b*Log[c*
x^n])^p/(e*r)), x] - Simp[b*f^m*n*(p/(e*r))   Int[Log[1 + e*(x^r/d)]*((a +
b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, r}, x] &
& EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && NeQ[r, n]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

3.363. $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx$

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.363.4 Maple [F]

$$\int \frac{(fx)^{m-1} (a + b\ln (c\,x^{n}))^{2}}{d + e\,x^{m}}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m),x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m),x)
```

3.363.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 178, normalized size of antiderivative = 1.38

$$\int \frac{(fx)^{-1+m} (a + b\log (cx^{n}))^{2}}{d + ex^{m}}\, dx = -\frac{2\,b^2 f^{m-1} n^2 \mathrm{polylog}\left(3, -\frac{ex^m}{d}\right) - 2\left(b^2 m n^2 \log (x) + b^2 m n \log (c) + abmn\right) f^{m-1} \mathrm{Li}_2\left(-\frac{ex^m+d}{d} + 1\right) - \left(b^2 m\right.}{}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m),x, algorithm="fricas")
```

output
```
-(2*b^2*f^(m - 1)*n^2*polylog(3, -e*x^m/d) - 2*(b^2*m*n^2*log(x) + b^2*m*n
*log(c) + a*b*m*n)*f^(m - 1)*dilog(-(e*x^m + d)/d + 1) - (b^2*m^2*log(c)^2
 + 2*a*b*m^2*log(c) + a^2*m^2)*f^(m - 1)*log(e*x^m + d) - (b^2*m^2*n^2*log
(x)^2 + 2*(b^2*m^2*n*log(c) + a*b*m^2*n)*log(x))*f^(m - 1)*log((e*x^m + d)
/d))/(e*m^3)
```

3.363.6 Sympy [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx = \int \frac{(fx)^{m-1}(a+b\log(cx^n))^2}{d+ex^m}\,dx$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2/(d+e*x**m),x)
```

output
```
Integral((f*x)**(m - 1)*(a + b*log(c*x**n))**2/(d + e*x**m), x)
```

3.363.7 Maxima [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx = \int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{ex^m+d}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m),x, algorithm="maxima")
```

output
```
a^2*f^(m - 1)*log((e*x^m + d)/e)/(e*m) + integrate((b^2*f^m*x^m*log(x^n)^2
 + 2*(b^2*f^m*log(c) + a*b*f^m)*x^m*log(x^n) + (b^2*f^m*log(c)^2 + 2*a*b*f
^m*log(c))*x^m)/(e*f*x*x^m + d*f*x), x)
```

3.363.8 Giac [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{d+ex^m}\,dx = \int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{ex^m+d}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*(f*x)^(m - 1)/(e*x^m + d), x)
```

3.363.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m} (a+b\log(cx^n))^2}{d+ex^m}\, dx = \int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))^2}{d+e\,x^m}\, dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m),x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m), x)
```

3.364 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx$

3.364.1 Optimal result

Integrand size = 29, antiderivative size = 138

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx = -\frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))^2}{em(d+ex^m)} - \frac{2bnx^{1-m}(fx)^{-1+m}(a+b\log(cx^n))\log\left(1+\frac{dx^{-m}}{e}\right)}{dem^2} + \frac{2b^2n^2x^{1-m}(fx)^{-1+m}\operatorname{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{dem^3}$$

output
```
-x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))^2/e/m/(d+e*x^m)-2*b*n*x^(1-m)*(f*x)^
(-1+m)*(a+b*ln(c*x^n))*ln(1+d/e/(x^m))/d/e/m^2+2*b^2*n^2*x^(1-m)*(f*x)^(-1
+m)*polylog(2,-d/e/(x^m))/d/e/m^3
```

3.364.2 Mathematica [A] (warning: unable to verify)

Time = 0.51 (sec) , antiderivative size = 157, normalized size of antiderivative = 1.14

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx = \frac{x^{-m}(fx)^m\left(-\frac{m^2(a+b\log(cx^n))^2}{d+ex^m} - \frac{2abmn\log(d-dx^m)}{d} + \frac{2b^2mn(n\log(x)-\log(cx^n))\log(d-dx^m)}{d} + \frac{2b^2n^2\left(\frac{1}{2}m^2\log^2(x)+\left(-m\log(\right.\right.}{}\right.}{efm^3}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^2,x]
```

output
```
((f*x)^m*(-((m^2*(a + b*Log[c*x^n])^2)/(d + e*x^m)) - (2*a*b*m*n*Log[d - d
*x^m])/d + (2*b^2*m*n*(n*Log[x] - Log[c*x^n])*Log[d - d*x^m])/d + (2*b^2*n
^2*((m^2*Log[x]^2)/2 + (-(m*Log[x]) + Log[-((e*x^m)/d)])*Log[d + e*x^m] +
PolyLog[2, 1 + (e*x^m)/d]))/d))/(e*f*m^3*x^m)
```

3.364.3 Rubi [A] (verified)

Time = 0.55 (sec) , antiderivative size = 109, normalized size of antiderivative = 0.79, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.138, Rules used = {2777, 2776, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}(a+b\log(cx^n))^2}{(d+ex^m)^2}dx$$

$$\Big\downarrow \text{2777}$$

$$x^{1-m}(fx)^{m-1}\int \frac{x^{m-1}(a+b\log(cx^n))^2}{(ex^m+d)^2}dx$$

$$\Big\downarrow \text{2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\int \frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{em}-\frac{(a+b\log(cx^n))^2}{em(d+ex^m)}\right)$$

$$\Big\downarrow \text{2779}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{bn\int \frac{\log\left(\frac{dx^{-m}}{e}+1\right)}{x}dx}{dm}-\frac{\log\left(\frac{dx^{-m}}{e}+1\right)(a+b\log(cx^n))}{dm}\right)}{em}-\frac{(a+b\log(cx^n))^2}{em(d+ex^m)}\right)$$

$$\Big\downarrow \text{2838}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{dm^2}-\frac{\log\left(\frac{dx^{-m}}{e}+1\right)(a+b\log(cx^n))}{dm}\right)}{em}-\frac{(a+b\log(cx^n))^2}{em(d+ex^m)}\right)$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^2,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-((a + b*Log[c*x^n])^2/(e*m*(d + e*x^m))) + (2*b
*n*(-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^m)])/(d*m)) + (b*n*PolyLog[2, -(d
/(e*x^m))])/(d*m^2)))/(e*m))
```

3.364.3.1 Defintions of rubi rules used

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.364.4 Maple [F]

$$\int \frac{(fx)^{m-1}(a+b\ln(c\,x^n))^2}{(d+e\,x^m)^2}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m)^2,x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m)^2,x)
```

3.364.5 Fricas [A] (verification not implemented)

Time = 0.30 (sec) , antiderivative size = 266, normalized size of antiderivative = 1.93

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx$$
$$= \frac{\left(b^2em^2n^2\log(x)^2+2\left(b^2em^2n\log(c)+abem^2n\right)\log(x)\right)f^{m-1}x^m-\left(b^2dm^2\log(c)^2+2\,abdm^2\log(c)+a^2\right.}{}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^2,x, algorithm="fricas
")
```

output
```
((b^2*e*m^2*n^2*log(x)^2 + 2*(b^2*e*m^2*n*log(c) + a*b*e*m^2*n)*log(x))*f^
(m - 1)*x^m - (b^2*d*m^2*log(c)^2 + 2*a*b*d*m^2*log(c) + a^2*d*m^2)*f^(m -
 1) - 2*(b^2*e*f^(m - 1)*n^2*x^m + b^2*d*f^(m - 1)*n^2)*dilog(-(e*x^m + d)
/d + 1) - 2*((b^2*e*m*n*log(c) + a*b*e*m*n)*f^(m - 1)*x^m + (b^2*d*m*n*log
(c) + a*b*d*m*n)*f^(m - 1))*log(e*x^m + d) - 2*(b^2*e*f^(m - 1)*m*n^2*x^m*
log(x) + b^2*d*f^(m - 1)*m*n^2*log(x))*log((e*x^m + d)/d))/(d*e^2*m^3*x^m
+ d^2*e*m^3)
```

3.364.6 Sympy [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx=\int \frac{(fx)^{m-1}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2/(d+e*x**m)**2,x)
```

output
```
Integral((f*x)**(m - 1)*(a + b*log(c*x**n))**2/(d + e*x**m)**2, x)
```

3.364.7 Maxima [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{(ex^m+d)^2}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^2,x, algorithm="maxima
")
```

output
```
2*a*b*f^m*n*(log(x)/(d*e*f*m) - log(e*x^m + d)/(d*e*f*m^2)) - (f^m*log(x^n
)^2/(e^2*f*m*x^m + d*e*f*m) - integrate((e*f^m*m*x^m*log(c)^2 + 2*(d*f^m*n
 + (e*f^m*m*log(c) + e*f^m*n)*x^m)*log(x^n))/(e^3*f*m*x*x^(2*m) + 2*d*e^2*
f*m*x*x^m + d^2*e*f*m*x), x))*b^2 - 2*a*b*f^m*log(c*x^n)/(e^2*f*m*x^m + d*
e*f*m) - a^2*f^m/(e^2*f*m*x^m + d*e*f*m)
```

3.364.8 Giac [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{(ex^m+d)^2}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*(f*x)^(m - 1)/(e*x^m + d)^2, x)
```

3.364.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^2}\,dx = \int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x^m)^2}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^2,x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^2, x)
```

3.365 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx$

3.365.1 Optimal result

Integrand size = 29, antiderivative size = 214

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx = -\frac{bnx(fx)^{-1+m}(a+b\log(cx^n))}{d^2m^2(d+ex^m)} - \frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))^2}{2em(d+ex^m)^2} - \frac{bnx^{1-m}(fx)^{-1+m}(a+b\log(cx^n))\log\left(1+\frac{dx^{-m}}{e}\right)}{d^2em^2} + \frac{b^2n^2x^{1-m}(fx)^{-1+m}\log(d+ex^m)}{d^2em^3} + \frac{b^2n^2x^{1-m}(fx)^{-1+m}\operatorname{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{d^2em^3}$$

output
```
-b*n*x*(f*x)^(-1+m)*(a+b*ln(c*x^n))/d^2/m^2/(d+e*x^m)-1/2*x^(1-m)*(f*x)^(-
1+m)*(a+b*ln(c*x^n))^2/e/m/(d+e*x^m)^2-b*n*x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*
x^n))*ln(1+d/e/(x^m))/d^2/e/m^2+b^2*n^2*x^(1-m)*(f*x)^(-1+m)*ln(d+e*x^m)/d
^2/e/m^3+b^2*n^2*x^(1-m)*(f*x)^(-1+m)*polylog(2,-d/e/(x^m))/d^2/e/m^3
```

3.365.2 Mathematica [A] (warning: unable to verify)

Time = 0.49 (sec) , antiderivative size = 207, normalized size of antiderivative = 0.97

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx$$
$$= \frac{x^{-m}(fx)^m\left(\frac{2bmn(a+b\log(cx^n))}{d(d+ex^m)} - \frac{m^2(a+b\log(cx^n))^2}{(d+ex^m)^2} - \frac{2abmn\log(d-dx^m)}{d^2} + \frac{2b^2n^2\log(d-dx^m)}{d^2} + \frac{2b^2mn(n\log(x)-\log(cx^n))\log}{d^2}\right.}{2efm^3}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^3,x]
```

output
```
((f*x)^m*((2*b*m*n*(a + b*Log[c*x^n]))/(d*(d + e*x^m)) - (m^2*(a + b*Log[c
*x^n])^2)/(d + e*x^m)^2 - (2*a*b*m*n*Log[d - d*x^m])/d^2 + (2*b^2*n^2*Log[
d - d*x^m])/d^2 + (2*b^2*m*n*(n*Log[x] - Log[c*x^n])*Log[d - d*x^m])/d^2 +
 (2*b^2*n^2*((m^2*Log[x]^2)/2 + (-(m*Log[x]) + Log[-((e*x^m)/d)])*Log[d +
e*x^m] + PolyLog[2, 1 + (e*x^m)/d]))/d^2))/(2*e*f*m^3*x^m)
```

3.365.3 Rubi [A] (verified)

Time = 0.88 (sec) , antiderivative size = 172, normalized size of antiderivative = 0.80, number of steps used = 7, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}} = 0.241$, Rules used = {2777, 2776, 2791, 2773, 792, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx$$
$$\Big\downarrow \ 2777$$
$$x^{1-m}(fx)^{m-1}\int \frac{x^{m-1}(a+b\log(cx^n))^2}{(ex^m+d)^3}dx$$
$$\Big\downarrow \ 2776$$
$$x^{1-m}(fx)^{m-1}\left(\frac{bn\int \frac{a+b\log(cx^n)}{x(ex^m+d)^2}dx}{em} - \frac{(a+b\log(cx^n))^2}{2em(d+ex^m)^2}\right)$$
$$\Big\downarrow \ 2791$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(\frac{\int\frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{d}-\frac{e\int\frac{x^{m-1}(a+b\log(cx^n))}{(ex^m+d)^2}dx}{d}\right)}{em}-\frac{(a+b\log(cx^n))^2}{2em(d+ex^m)^2}\right)$$

$$\Big\downarrow \text{2773}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(\frac{\int\frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\int\frac{x^{m-1}}{ex^m+d}dx}{dm}\right)}{d}\right)}{em}-\frac{(a+b\log(cx^n))^2}{2em(d+ex^m)^2}\right)$$

$$\Big\downarrow \text{792}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(\frac{\int\frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\log(d+ex^m)}{dem^2}\right)}{d}\right)}{em}-\frac{(a+b\log(cx^n))^2}{2em(d+ex^m)^2}\right)$$

$$\Big\downarrow \text{2779}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(\frac{\frac{bn\int\frac{\log\left(\frac{dx^{-m}}{e}+1\right)}{x}dx}{dm}-\frac{\log\left(\frac{dx^{-m}}{e}+1\right)(a+b\log(cx^n))}{dm}}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\log(d+ex^m)}{dem^2}\right)}{d}\right)}{em}-\frac{(a+b\log(cx}{2em(d+ex}\right.$$

$$\Big\downarrow \text{2838}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{bn\left(\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{dm^2}-\frac{\log\left(\frac{dx^{-m}}{e}+1\right)(a+b\log(cx^n))}{dm}}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\log(d+ex^m)}{dem^2}\right)}{d}\right)}{em}-\frac{(a+b\log(cx}{2em(d+ex}\right.$$

3.365. $\int\frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^3,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/2*(a + b*Log[c*x^n])^2/(e*m*(d + e*x^m)^2) +
(b*n*(-((e*((x^m*(a + b*Log[c*x^n]))/(d*m*(d + e*x^m)) - (b*n*Log[d + e*x^
m])/(d*e*m^2)))/d) + (-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^m)])/(d*m)) + (
b*n*PolyLog[2, -(d/(e*x^m))])/(d*m^2))/d))/(e*m))
```

3.365.3.1 Defintions of rubi rules used

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

3.365. $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx$

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.365.4 Maple [F]

$$\int \frac{(fx)^{m-1}\left(a+b\ln\left(c\,x^{n}\right)\right)^{2}}{\left(d+e\,x^{m}\right)^{3}}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m)^3,x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m)^3,x)
```

3.365.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 535 vs. $2(211) = 422$.

Time = 0.30 (sec) , antiderivative size = 535, normalized size of antiderivative = 2.50

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx = \frac{\left(b^2e^2m^2n^2\log(x)^2+2\left(b^2e^2m^2n\log(c)+abe^2m^2n-b^2e^2mn^2\right)\log(x)\right)f^{m-1}x^{2m}+2\left(b^2dem^2n^2\log(x)^2\right.}{}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^3,x, algorithm="fricas
")
```

output
```
1/2*((b^2*e^2*m^2*n^2*log(x)^2 + 2*(b^2*e^2*m^2*n*log(c) + a*b*e^2*m^2*n -
 b^2*e^2*m*n^2)*log(x))*f^(m - 1)*x^(2*m) + 2*(b^2*d*e*m^2*n^2*log(x)^2 +
b^2*d*e*m*n*log(c) + a*b*d*e*m*n + (2*b^2*d*e*m^2*n*log(c) + 2*a*b*d*e*m^2
*n - b^2*d*e*m*n^2)*log(x))*f^(m - 1)*x^m - (b^2*d^2*m^2*log(c)^2 + a^2*d^
2*m^2 - 2*a*b*d^2*m*n + 2*(a*b*d^2*m^2 - b^2*d^2*m*n)*log(c))*f^(m - 1) -
2*(b^2*e^2*f^(m - 1)*n^2*x^(2*m) + 2*b^2*d*e*f^(m - 1)*n^2*x^m + b^2*d^2*f
^(m - 1)*n^2)*dilog(-(e*x^m + d)/d + 1) - 2*((b^2*e^2*m*n*log(c) + a*b*e^2
*m*n - b^2*e^2*n^2)*f^(m - 1)*x^(2*m) + 2*(b^2*d*e*m*n*log(c) + a*b*d*e*m*
n - b^2*d*e*n^2)*f^(m - 1)*x^m + (b^2*d^2*m*n*log(c) + a*b*d^2*m*n - b^2*d
^2*n^2)*f^(m - 1))*log(e*x^m + d) - 2*(b^2*e^2*f^(m - 1)*m*n^2*x^(2*m)*log
(x) + 2*b^2*d*e*f^(m - 1)*m*n^2*x^m*log(x) + b^2*d^2*f^(m - 1)*m*n^2*log(x
))*log((e*x^m + d)/d))/(d^2*e^3*m^3*x^(2*m) + 2*d^3*e^2*m^3*x^m + d^4*e*m^
3)
```

3.365.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx = \text{Timed out}$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2/(d+e*x**m)**3,x)
```

output
```
Timed out
```

3.365.7 Maxima [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{(ex^m+d)^3}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^3,x, algorithm="maxima
")
```

output
```
a*b*f^m*n*(1/((d*e^2*f*m*x^m + d^2*e*f*m)*m) + log(x)/(d^2*e*f*m) - log(e*
x^m + d)/(d^2*e*f*m^2)) - 1/2*(f^m*log(x^n)^2/(e^3*f*m*x^(2*m) + 2*d*e^2*f
*m*x^m + d^2*e*f*m) - 2*integrate((e*f^m*m*x^m*log(c)^2 + (d*f^m*n + (2*e*
f^m*m*log(c) + e*f^m*n)*x^m)*log(x^n))/(e^4*f*m*x*x^(3*m) + 3*d*e^3*f*m*x*
x^(2*m) + 3*d^2*e^2*f*m*x*x^m + d^3*e*f*m*x), x))*b^2 - a*b*f^m*log(c*x^n)
/(e^3*f*m*x^(2*m) + 2*d*e^2*f*m*x^m + d^2*e*f*m) - 1/2*a^2*f^m/(e^3*f*m*x^
(2*m) + 2*d*e^2*f*m*x^m + d^2*e*f*m)
```

3.365.8 Giac [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{(ex^m+d)^3}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*(f*x)^(m - 1)/(e*x^m + d)^3, x)
```

3.365.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^3}\,dx = \int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x^m)^3}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^3,x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^3, x)
```

3.366 $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx$

3.366.1 Optimal result

Integrand size = 29, antiderivative size = 346

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx = -\frac{b^2n^2x^{1-m}(fx)^{-1+m}}{3d^2em^3(d+ex^m)} - \frac{b^2n^2x^{1-m}(fx)^{-1+m}\log(x)}{3d^3em^2} + \frac{bnx^{1-m}(fx)^{-1+m}(a+b\log(cx^n))}{3dem^2(d+ex^m)^2} - \frac{2bnx(fx)^{-1+m}(a+b\log(cx^n))}{3d^3m^2(d+ex^m)} - \frac{x^{1-m}(fx)^{-1+m}(a+b\log(cx^n))^2}{3em(d+ex^m)^3} - \frac{2bnx^{1-m}(fx)^{-1+m}(a+b\log(cx^n))\log\left(1+\frac{dx^{-m}}{e}\right)}{3d^3em^2} + \frac{b^2n^2x^{1-m}(fx)^{-1+m}\log(d+ex^m)}{d^3em^3} + \frac{2b^2n^2x^{1-m}(fx)^{-1+m}\operatorname{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{3d^3em^3}$$

output
```
-1/3*b^2*n^2*x^(1-m)*(f*x)^(-1+m)/d^2/e/m^3/(d+e*x^m)-1/3*b^2*n^2*x^(1-m)*
(f*x)^(-1+m)*ln(x)/d^3/e/m^2+1/3*b*n*x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))/
d/e/m^2/(d+e*x^m)^2-2/3*b*n*x*(f*x)^(-1+m)*(a+b*ln(c*x^n))/d^3/m^2/(d+e*x^
m)-1/3*x^(1-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))^2/e/m/(d+e*x^m)^3-2/3*b*n*x^(1
-m)*(f*x)^(-1+m)*(a+b*ln(c*x^n))*ln(1+d/e/(x^m))/d^3/e/m^2+b^2*n^2*x^(1-m)
*(f*x)^(-1+m)*ln(d+e*x^m)/d^3/e/m^3+2/3*b^2*n^2*x^(1-m)*(f*x)^(-1+m)*polyl
og(2,-d/e/(x^m))/d^3/e/m^3
```

3.366.2 Mathematica [A] (warning: unable to verify)

Time = 0.60 (sec) , antiderivative size = 240, normalized size of antiderivative = 0.69

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx$$
$$= \frac{x^{-m}(fx)^m\left(\frac{bmn(a+b\log(cx^n))}{d(d+ex^m)^2}-\frac{m^2(a+b\log(cx^n))^2}{(d+ex^m)^3}+\frac{bn(2am-bn+2bm\log(cx^n))}{d^2(d+ex^m)}-\frac{2abmn\log(d-dx^m)}{d^3}+\frac{3b^2n^2\log(d-dx^m)}{d^3}+\right.}{3efm^3}$$

input
```
Integrate[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^4,x]
```

output
```
((f*x)^m*((b*m*n*(a + b*Log[c*x^n]))/(d*(d + e*x^m)^2) - (m^2*(a + b*Log[c
*x^n])^2)/(d + e*x^m)^3 + (b*n*(2*a*m - b*n + 2*b*m*Log[c*x^n]))/(d^2*(d +
 e*x^m)) - (2*a*b*m*n*Log[d - d*x^m])/d^3 + (3*b^2*n^2*Log[d - d*x^m])/d^3
 + (2*b^2*m*n*(n*Log[x] - Log[c*x^n])*Log[d - d*x^m])/d^3 + (2*b^2*n^2*((m
^2*Log[x]^2)/2 + (-(m*Log[x]) + Log[-((e*x^m)/d)])*Log[d + e*x^m] + PolyLo
g[2, 1 + (e*x^m)/d]))/d^3))/(3*e*f*m^3*x^m)
```

3.366.3 Rubi [A] (verified)

Time = 1.44 (sec) , antiderivative size = 263, normalized size of antiderivative = 0.76, number of steps used = 13, number of rules used = 12, $\frac{\text{number of rules}}{\text{integrand size}} = 0.414$, Rules used = {2777, 2776, 2791, 2776, 798, 54, 2009, 2791, 2773, 792, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^{m-1}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx$$

$$\Big\downarrow \text{2777}$$

$$x^{1-m}(fx)^{m-1}\int \frac{x^{m-1}(a+b\log(cx^n))^2}{(ex^m+d)^4}dx$$

$$\Big\downarrow \text{2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\int \frac{a+b\log(cx^n)}{x(ex^m+d)^3}dx}{3em}-\frac{(a+b\log(cx^n))^2}{3em(d+ex^m)^3}\right)$$

$$\Big\downarrow \text{2791}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)^2}dx}{d}-\frac{e\int \frac{x^{m-1}(a+b\log(cx^n))}{(ex^m+d)^3}dx}{d}\right)}{3em}-\frac{(a+b\log(cx^n))^2}{3em(d+ex^m)^3}\right)$$

$$\Big\downarrow \text{2776}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(ex^m+d)^2}dx}{2em}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)}{d}\right)}{3em}-\frac{(a+b\log(cx^n))^2}{3em(d+ex^m)^3}\right)$$

$$\Big\downarrow \text{798}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{x^{-m}}{(ex^m+d)^2}dx^m}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)}{d}\right)}{3em}-\frac{(a+b\log(cx^n))^2}{3em(d+ex^m)^3}\right)$$

$$\Big\downarrow \text{54}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^m+d)^2}dx}{d}-\frac{e\left(\frac{bn\int \left(\frac{x^{-m}}{d^2}-\frac{e}{d^2(ex^m+d)}-\frac{e}{d(ex^m+d)^2}\right)dx^m}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)}{d}\right)}{3em}-\frac{(a+b\log(cx^n))^2}{3em(d+ex^m)^3}\right)$$

$$\Big\downarrow \text{2009}$$

3.366. $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\int\frac{a+b\log(cx^n)}{x(ex^m+d)^2}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^m)}{d^2}+\frac{\log(x^m)}{d^2}+\frac{1}{d(d+ex^m)}\right)}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)}{d}\right)}{3em}-\frac{(a+b\log(cx^n))^2}{3em\,(d+ex^m)^3}\right)$$

$$\Big\downarrow \; 2791$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\frac{\int\frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{d}-\frac{e\int\frac{x^{m-1}(a+b\log(cx^n))}{(ex^m+d)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^m)}{d^2}+\frac{\log(x^m)}{d^2}+\frac{1}{d(d+ex^m)}\right)}{2em^2}-\frac{a+b\log(cx^n)}{2em(d+ex^m)^2}\right)}{d}\right)}{3em}-\cdots\right.$$

$$\Big\downarrow \; 2773$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\frac{\int\frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\int\frac{x^{m-1}}{ex^m+d}dx}{dm}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^m)}{d^2}+\frac{\log(x^m)}{d^2}+\frac{1}{d(d+ex^m)}\right)}{2em^2}-\frac{a+b\log(c\cdots}{2em(d+e\cdots}\cdots\right.}{d}\cdots\right.}{3em}\cdots\right.$$

$$\Big\downarrow \; 792$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\frac{\int\frac{a+b\log(cx^n)}{x(ex^m+d)}dx}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\log(d+ex^m)}{dem^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^m)}{d^2}+\frac{\log(x^m)}{d^2}+\frac{1}{d(d+ex^m)}\right)}{2em^2}-\frac{a+b\log(cx\cdots}{2em(d+ex\cdots}\cdots\right.}{d}\cdots\right.}{3em}\cdots\right.$$

3.366. $\int\frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx$

$$\Big\downarrow \text{2779}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\frac{\frac{bn\int \frac{\log\left(\frac{dx^{-m}}{e}+1\right)}{x}dx}{dm}-\frac{\log\left(\frac{dx^{-m}}{e}+1\right)(a+b\log(cx^n))}{dm}}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\log(d+ex^m)}{dem^2}\right)}{d}}{d}-\frac{e\left(bn\left(-\frac{\log(d+ex^m)}{d^2}\cdots\right.\right.}{\cdots}\cdots\right)}{3em}\cdots\right)$$

$$\Big\downarrow \text{2838}$$

$$x^{1-m}(fx)^{m-1}\left(\frac{2bn\left(\frac{\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-m}}{e}\right)}{dm^2}-\frac{\log\left(\frac{dx^{-m}}{e}+1\right)(a+b\log(cx^n))}{dm}}{d}-\frac{e\left(\frac{x^m(a+b\log(cx^n))}{dm(d+ex^m)}-\frac{bn\log(d+ex^m)}{dem^2}\right)}{d}}{d}-\frac{e\left(bn\left(-\frac{\log(d+ex^m)}{d^2}\cdots\right.\right.}{\cdots}\cdots\right)}{3em}\cdots\right)$$

input
```
Int[((f*x)^(-1 + m)*(a + b*Log[c*x^n])^2)/(d + e*x^m)^4,x]
```

output
```
x^(1 - m)*(f*x)^(-1 + m)*(-1/3*(a + b*Log[c*x^n])^2/(e*m*(d + e*x^m)^3) +
(2*b*n*(-((e*(-1/2*(a + b*Log[c*x^n])/(e*m*(d + e*x^m)^2) + (b*n*(1/(d*(d
+ e*x^m)) + Log[x^m]/d^2 - Log[d + e*x^m]/d^2))/(2*e*m^2)))/d) + (-((e*((x
^m*(a + b*Log[c*x^n]))/(d*m*(d + e*x^m)) - (b*n*Log[d + e*x^m])/(d*e*m^2))
)/d) + (-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^m)])/(d*m)) + (b*n*PolyLog[2,
 -(d/(e*x^m))])/(d*m^2))/d)/d))/(3*e*m))
```

3.366.3.1 Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2777
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[(f*x)^m/x^m   Int[x^m*(d + e*x^r)^
q*(a + b*Log[c*x^n])^p, x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
&& EqQ[m, r - 1] && IGtQ[p, 0] &&  !(IntegerQ[m] || GtQ[f, 0])
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

3.366. $\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx$

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.366.4 Maple [F]

$$\int \frac{(fx)^{m-1} (a+b\ln(c\,x^n))^2}{(d+e\,x^m)^4}dx$$

input
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m)^4,x)
```

output
```
int((f*x)^(m-1)*(a+b*ln(c*x^n))^2/(d+e*x^m)^4,x)
```

3.366.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 810 vs. 2(331) = 662.

Time = 0.31 (sec) , antiderivative size = 810, normalized size of antiderivative = 2.34

$$\int \frac{(fx)^{-1+m} (a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx = \frac{\left(b^2e^3m^2n^2\log(x)^2 + \left(2\,b^2e^3m^2n\log(c) + 2\,abe^3m^2n - 3\,b^2e^3mn^2\right)\log(x)\right)f^{m-1}x^{3\,m} + \left(3\,b^2de^2m^2n^2\log(x\right.}{}$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^4,x, algorithm="fricas
")
```

output
```
1/3*((b^2*e^3*m^2*n^2*log(x)^2 + (2*b^2*e^3*m^2*n*log(c) + 2*a*b*e^3*m^2*n
 - 3*b^2*e^3*m*n^2)*log(x))*f^(m - 1)*x^(3*m) + (3*b^2*d*e^2*m^2*n^2*log(x
)^2 + 2*b^2*d*e^2*m*n*log(c) + 2*a*b*d*e^2*m*n - b^2*d*e^2*n^2 + (6*b^2*d*
e^2*m^2*n*log(c) + 6*a*b*d*e^2*m^2*n - 7*b^2*d*e^2*m*n^2)*log(x))*f^(m - 1
)*x^(2*m) + (3*b^2*d^2*e*m^2*n^2*log(x)^2 + 5*b^2*d^2*e*m*n*log(c) + 5*a*b
*d^2*e*m*n - 2*b^2*d^2*e*n^2 + 2*(3*b^2*d^2*e*m^2*n*log(c) + 3*a*b*d^2*e*m
^2*n - 2*b^2*d^2*e*m*n^2)*log(x))*f^(m - 1)*x^m - (b^2*d^3*m^2*log(c)^2 +
a^2*d^3*m^2 - 3*a*b*d^3*m*n + b^2*d^3*n^2 + (2*a*b*d^3*m^2 - 3*b^2*d^3*m*n
)*log(c))*f^(m - 1) - 2*(b^2*e^3*f^(m - 1)*n^2*x^(3*m) + 3*b^2*d*e^2*f^(m
- 1)*n^2*x^(2*m) + 3*b^2*d^2*e*f^(m - 1)*n^2*x^m + b^2*d^3*f^(m - 1)*n^2)*
dilog(-(e*x^m + d)/d + 1) - ((2*b^2*e^3*m*n*log(c) + 2*a*b*e^3*m*n - 3*b^2
*e^3*n^2)*f^(m - 1)*x^(3*m) + 3*(2*b^2*d*e^2*m*n*log(c) + 2*a*b*d*e^2*m*n
- 3*b^2*d*e^2*n^2)*f^(m - 1)*x^(2*m) + 3*(2*b^2*d^2*e*m*n*log(c) + 2*a*b*d
^2*e*m*n - 3*b^2*d^2*e*n^2)*f^(m - 1)*x^m + (2*b^2*d^3*m*n*log(c) + 2*a*b*
d^3*m*n - 3*b^2*d^3*n^2)*f^(m - 1))*log(e*x^m + d) - 2*(b^2*e^3*f^(m - 1)*
m*n^2*x^(3*m)*log(x) + 3*b^2*d*e^2*f^(m - 1)*m*n^2*x^(2*m)*log(x) + 3*b^2*
d^2*e*f^(m - 1)*m*n^2*x^m*log(x) + b^2*d^3*f^(m - 1)*m*n^2*log(x))*log((e*
x^m + d)/d))/(d^3*e^4*m^3*x^(3*m) + 3*d^4*e^3*m^3*x^(2*m) + 3*d^5*e^2*m^3*
x^m + d^6*e*m^3)
```

3.366.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx = \text{Timed out}$$

input
```
integrate((f*x)**(-1+m)*(a+b*ln(c*x**n))**2/(d+e*x**m)**4,x)
```

output
```
Timed out
```

3.366.7 Maxima [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{(ex^m+d)^4}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^4,x, algorithm="maxima
")
```

output
```
1/3*a*b*f^m*n*((2*e*x^m + 3*d)/((d^2*e^3*f*m*x^(2*m) + 2*d^3*e^2*f*m*x^m +
 d^4*e*f*m)*m) + 2*log(x)/(d^3*e*f*m) - 2*log(e*x^m + d)/(d^3*e*f*m^2)) -
1/3*(f^m*log(x^n)^2/(e^4*f*m*x^(3*m) + 3*d*e^3*f*m*x^(2*m) + 3*d^2*e^2*f*m
*x^m + d^3*e*f*m) - 3*integrate(1/3*(3*e*f^m*m*x^m*log(c)^2 + 2*(d*f^m*n +
 (3*e*f^m*m*log(c) + e*f^m*n)*x^m)*log(x^n))/(e^5*f*m*x*x^(4*m) + 4*d*e^4*
f*m*x*x^(3*m) + 6*d^2*e^3*f*m*x*x^(2*m) + 4*d^3*e^2*f*m*x*x^m + d^4*e*f*m*
x), x))*b^2 - 2/3*a*b*f^m*log(c*x^n)/(e^4*f*m*x^(3*m) + 3*d*e^3*f*m*x^(2*m
) + 3*d^2*e^2*f*m*x^m + d^3*e*f*m) - 1/3*a^2*f^m/(e^4*f*m*x^(3*m) + 3*d*e^
3*f*m*x^(2*m) + 3*d^2*e^2*f*m*x^m + d^3*e*f*m)
```

3.366.8 Giac [F]

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx = \int \frac{(b\log(cx^n)+a)^2(fx)^{m-1}}{(ex^m+d)^4}\,dx$$

input
```
integrate((f*x)^(-1+m)*(a+b*log(c*x^n))^2/(d+e*x^m)^4,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2*(f*x)^(m - 1)/(e*x^m + d)^4, x)
```

3.366.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(fx)^{-1+m}(a+b\log(cx^n))^2}{(d+ex^m)^4}\,dx = \int \frac{(f\,x)^{m-1}\,(a+b\,\ln(c\,x^n))^2}{(d+e\,x^m)^4}\,dx$$

input
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^4,x)
```

output
```
int(((f*x)^(m - 1)*(a + b*log(c*x^n))^2)/(d + e*x^m)^4, x)
```

3.367 $\int x^5(d+ex^r)(a+b\log(cx^n))\,dx$

3.367.1 Optimal result

Integrand size = 21, antiderivative size = 59

$$\int x^5(d+ex^r)(a+b\log(cx^n))\,dx=-\frac{1}{36}bdnx^6-\frac{benx^{6+r}}{(6+r)^2}+\frac{1}{6}\left(dx^6+\frac{6ex^{6+r}}{6+r}\right)(a+b\log(cx^n))$$

output
```
-1/36*b*d*n*x^6-b*e*n*x^(6+r)/(6+r)^2+1/6*(d*x^6+6*e*x^(6+r)/(6+r))*(a+b*l
n(c*x^n))
```

3.367.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.24

$$\int x^5(d+ex^r)(a+b\log(cx^n))\,dx$$
$$=\frac{x^6(6a(6+r)(d(6+r)+6ex^r)-bn(d(6+r)^2+36ex^r)+6b(6+r)(d(6+r)+6ex^r)\log(cx^n))}{36(6+r)^2}$$

input
```
Integrate[x^5*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
(x^6*(6*a*(6 + r)*(d*(6 + r) + 6*e*x^r) - b*n*(d*(6 + r)^2 + 36*e*x^r) + 6
*b*(6 + r)*(d*(6 + r) + 6*e*x^r)*Log[c*x^n]))/(36*(6 + r)^2)
```

3.367.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5(d+ex^r)\,(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \; 2771$$

$$\frac{1}{6}\left(dx^6+\frac{6ex^{r+6}}{r+6}\right)(a+b\log(cx^n))-bn\int \frac{1}{6}x^5\left(\frac{6ex^r}{r+6}+d\right)dx$$

$$\Big\downarrow \; 27$$

$$\frac{1}{6}\left(dx^6+\frac{6ex^{r+6}}{r+6}\right)(a+b\log(cx^n))-\frac{1}{6}bn\int x^5\left(\frac{6ex^r}{r+6}+d\right)dx$$

$$\Big\downarrow \; 802$$

$$\frac{1}{6}\left(dx^6+\frac{6ex^{r+6}}{r+6}\right)(a+b\log(cx^n))-\frac{1}{6}bn\int \left(\frac{6ex^{r+5}}{r+6}+dx^5\right)dx$$

$$\Big\downarrow \; 2009$$

$$\frac{1}{6}\left(dx^6+\frac{6ex^{r+6}}{r+6}\right)(a+b\log(cx^n))-\frac{1}{6}bn\left(\frac{dx^6}{6}+\frac{6ex^{r+6}}{(r+6)^2}\right)$$

input
```
Int[x^5*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-1/6*(b*n*((d*x^6)/6 + (6*e*x^(6 + r))/(6 + r)^2)) + ((d*x^6 + (6*e*x^(6 +
 r))/(6 + r))*(a + b*Log[c*x^n]))/6
```

3.367.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.367.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 173 vs. $2(55) = 110$.

Time = 4.80 (sec) , antiderivative size = 174, normalized size of antiderivative = 2.95

method	result
parallelrisch	$-\frac{-36x^6x^r\ln(c\,x^n)ber-6x^6\ln(c\,x^n)bd\,r^2+x^6bdn\,r^2-216be\ln(c\,x^n)x^rx^6-36x^6x^raer+36x^6x^rben-72x^6\ln(c\,x^n)bdr-6x^6ad}{36(r^2+12r+36)}$
risch	$\frac{b\,x^6(dr+6e\,x^r+6d)\ln(x^n)}{36+6r}-\frac{x^6\left(-216x^rae+36bdn-216ad-36x^raer+36x^rben-108i\pi bd\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2-3i\pi bd\,r^2\right.}{}$

input
```
int(x^5*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/36*(-36*x^6*x^r*ln(c*x^n)*b*e*r-6*x^6*ln(c*x^n)*b*d*r^2+x^6*b*d*n*r^2-2
16*b*e*ln(c*x^n)*x^r*x^6-36*x^6*x^r*a*e*r+36*x^6*x^r*b*e*n-72*x^6*ln(c*x^n
)*b*d*r-6*x^6*a*d*r^2+12*x^6*b*d*n*r-216*x^6*x^r*a*e-216*x^6*ln(c*x^n)*b*d
-72*x^6*a*d*r+36*b*d*n*x^6-216*a*d*x^6)/(r^2+12*r+36)
```

3.367.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. $2(55) = 110$.

Time = 0.30 (sec) , antiderivative size = 159, normalized size of antiderivative = 2.69

$$\int x^5(d+ex^r)\,(a+b\log{(cx^n)})\,\,dx$$
$$= \frac{6\,(bdr^2+12\,bdr+36\,bd)x^6\log{(c)}+6\,(bdnr^2+12\,bdnr+36\,bdn)x^6\log{(x)}-(36\,bdn+(bdn-6\,ad)r^2-}{36\,(r^2}$$

input
```
integrate(x^5*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/36*(6*(b*d*r^2 + 12*b*d*r + 36*b*d)*x^6*log(c) + 6*(b*d*n*r^2 + 12*b*d*n
*r + 36*b*d*n)*x^6*log(x) - (36*b*d*n + (b*d*n - 6*a*d)*r^2 - 216*a*d + 12
*(b*d*n - 6*a*d)*r)*x^6 + 36*((b*e*r + 6*b*e)*x^6*log(c) + (b*e*n*r + 6*b*
e*n)*x^6*log(x) - (b*e*n - a*e*r - 6*a*e)*x^6)*x^r)/(r^2 + 12*r + 36)
```

3.367.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 398 vs. $2(51) = 102$.

Time = 8.57 (sec) , antiderivative size = 398, normalized size of antiderivative = 6.75

$$\int x^5(d+ex^r)\,(a+b\log{(cx^n)})\,\,dx$$
$$= \begin{cases} \frac{6adr^2x^6}{36r^2+432r+1296}+\frac{72adrx^6}{36r^2+432r+1296}+\frac{216adx^6}{36r^2+432r+1296}+\frac{36aerx^6x^r}{36r^2+432r+1296}+\frac{216aex^6x^r}{36r^2+432r+1296}-\frac{bdnr^2x^6}{36r^2+432r+1296}-\frac{12b}{36r^2+4} \\ \frac{adx^6}{6}+\frac{ae\log{(cx^n)}}{n}-\frac{bdnx^6}{36}+\frac{bdx^6\log{(cx^n)}}{6}+\frac{be\log{(cx^n)}^2}{2n} \end{cases}$$

input
```
integrate(x**5*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((6*a*d*r**2*x**6/(36*r**2 + 432*r + 1296) + 72*a*d*r*x**6/(36*r*
*2 + 432*r + 1296) + 216*a*d*x**6/(36*r**2 + 432*r + 1296) + 36*a*e*r*x**6
*x**r/(36*r**2 + 432*r + 1296) + 216*a*e*x**6*x**r/(36*r**2 + 432*r + 1296
) - b*d*n*r**2*x**6/(36*r**2 + 432*r + 1296) - 12*b*d*n*r*x**6/(36*r**2 +
432*r + 1296) - 36*b*d*n*x**6/(36*r**2 + 432*r + 1296) + 6*b*d*r**2*x**6*l
og(c*x**n)/(36*r**2 + 432*r + 1296) + 72*b*d*r*x**6*log(c*x**n)/(36*r**2 +
 432*r + 1296) + 216*b*d*x**6*log(c*x**n)/(36*r**2 + 432*r + 1296) - 36*b*
e*n*x**6*x**r/(36*r**2 + 432*r + 1296) + 36*b*e*r*x**6*x**r*log(c*x**n)/(3
6*r**2 + 432*r + 1296) + 216*b*e*x**6*x**r*log(c*x**n)/(36*r**2 + 432*r +
1296), Ne(r, -6)), (a*d*x**6/6 + a*e*log(c*x**n)/n - b*d*n*x**6/36 + b*d*x
**6*log(c*x**n)/6 + b*e*log(c*x**n)**2/(2*n), True))
```

3.367.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 76, normalized size of antiderivative = 1.29

$$\int x^5(d+ex^r)\,(a+b\log{(cx^n)})\,\,dx = -\frac{1}{36}\,bdnx^6 + \frac{1}{6}\,bdx^6\log{(cx^n)} + \frac{1}{6}\,adx^6 + \frac{bex^{r+6}\log{(cx^n)}}{r+6} - \frac{benx^{r+6}}{(r+6)^2} + \frac{aex^{r+6}}{r+6}$$

input
```
integrate(x^5*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*d*n*x^6 + 1/6*b*d*x^6*log(c*x^n) + 1/6*a*d*x^6 + b*e*x^(r + 6)*log
(c*x^n)/(r + 6) - b*e*n*x^(r + 6)/(r + 6)^2 + a*e*x^(r + 6)/(r + 6)
```

3.367.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 132 vs. 2(55) = 110.

Time = 0.33 (sec) , antiderivative size = 132, normalized size of antiderivative = 2.24

$$\int x^5(d+ex^r)\,(a+b\log{(cx^n)})\,\,dx = \frac{benrx^6x^r\log{(x)}}{r^2+12\,r+36} + \frac{6\,benx^6x^r\log{(x)}}{r^2+12\,r+36} + \frac{1}{6}\,bdnx^6\log{(x)} - \frac{benx^6x^r}{r^2+12\,r+36} - \frac{1}{36}\,bdnx^6 + \frac{bex^6x^r\log{(c)}}{r+6} + \frac{1}{6}\,bdx^6\log{(c)} + \frac{aex^6x^r}{r+6} + \frac{1}{6}\,adx^6$$

input
```
integrate(x^5*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*n*r*x^6*x^r*log(x)/(r^2 + 12*r + 36) + 6*b*e*n*x^6*x^r*log(x)/(r^2 + 1
2*r + 36) + 1/6*b*d*n*x^6*log(x) - b*e*n*x^6*x^r/(r^2 + 12*r + 36) - 1/36*
b*d*n*x^6 + b*e*x^6*x^r*log(c)/(r + 6) + 1/6*b*d*x^6*log(c) + a*e*x^6*x^r/
(r + 6) + 1/6*a*d*x^6
```

3.367.9 Mupad [F(-1)]

Timed out.

$$\int x^5(d+ex^r)\,(a+b\log{(cx^n)})\;dx=\int x^5\,(d+e\,x^r)\,(a+b\,\ln{(c\,x^n)})\;dx$$

input
```
int(x^5*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int(x^5*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.368 $\int x^3(d+ex^r)(a+b\log(cx^n))\,dx$

3.368.1 Optimal result

Integrand size = 21, antiderivative size = 59

$$\int x^3(d+ex^r)(a+b\log(cx^n))\,dx=-\frac{1}{16}bdnx^4-\frac{benx^{4+r}}{(4+r)^2}+\frac{1}{4}\left(dx^4+\frac{4ex^{4+r}}{4+r}\right)(a+b\log(cx^n))$$

output
```
-1/16*b*d*n*x^4-b*e*n*x^(4+r)/(4+r)^2+1/4*(d*x^4+4*e*x^(4+r)/(4+r))*(a+b*l
n(c*x^n))
```

3.368.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.24

$$\int x^3(d+ex^r)(a+b\log(cx^n))\,dx$$
$$=\frac{x^4(4a(4+r)(d(4+r)+4ex^r)-bn(d(4+r)^2+16ex^r)+4b(4+r)(d(4+r)+4ex^r)\log(cx^n))}{16(4+r)^2}$$

input
```
Integrate[x^3*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(4*a*(4 + r)*(d*(4 + r) + 4*e*x^r) - b*n*(d*(4 + r)^2 + 16*e*x^r) + 4
*b*(4 + r)*(d*(4 + r) + 4*e*x^r)*Log[c*x^n]))/(16*(4 + r)^2)
```

3.368.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex^r)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{4}\left(dx^4+\frac{4ex^{r+4}}{r+4}\right)(a+b\log(cx^n))-bn\int\frac{1}{4}x^3\left(\frac{4ex^r}{r+4}+d\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\left(dx^4+\frac{4ex^{r+4}}{r+4}\right)(a+b\log(cx^n))-\frac{1}{4}bn\int x^3\left(\frac{4ex^r}{r+4}+d\right)dx$$

$$\Big\downarrow \text{802}$$

$$\frac{1}{4}\left(dx^4+\frac{4ex^{r+4}}{r+4}\right)(a+b\log(cx^n))-\frac{1}{4}bn\int\left(\frac{4ex^{r+3}}{r+4}+dx^3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(dx^4+\frac{4ex^{r+4}}{r+4}\right)(a+b\log(cx^n))-\frac{1}{4}bn\left(\frac{dx^4}{4}+\frac{4ex^{r+4}}{(r+4)^2}\right)$$

input
```
Int[x^3*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-1/4*(b*n*((d*x^4)/4 + (4*e*x^(4 + r))/(4 + r)^2)) + ((d*x^4 + (4*e*x^(4 +
 r))/(4 + r))*(a + b*Log[c*x^n]))/4
```

3.368.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.368.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 168 vs. $2(55) = 110$.

Time = 1.32 (sec) , antiderivative size = 169, normalized size of antiderivative = 2.86

method	result
parallelrisch	$-\frac{-16x^4x^r\ln(cx^n)ber-4x^4\ln(cx^n)bdr^2+x^4bdnr^2-64x^4x^r\ln(cx^n)be-16x^4x^raer+16x^4x^rben-32x^4\ln(cx^n)bdr-4x^4adr}{16(4+r)^2}$
risch	$\frac{bx^4(dr+4ex^r+4d)\ln(x^n)}{16+4r}-\frac{x^4\left(-64x^rae+16bdn-64ad-16x^raer+16x^rben-32i\pi bd\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(icx^n)^2-2i\pi bdr^2\,\mathrm{csgn}\right.}{}$

input
```
int(x^3*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/16*(-16*x^4*x^r*ln(c*x^n)*b*e*r-4*x^4*ln(c*x^n)*b*d*r^2+x^4*b*d*n*r^2-6
4*x^4*x^r*ln(c*x^n)*b*e-16*x^4*x^r*a*e*r+16*x^4*x^r*b*e*n-32*x^4*ln(c*x^n)
*b*d*r-4*x^4*a*d*r^2+8*x^4*b*d*n*r-64*x^4*x^r*a*e-64*x^4*ln(c*x^n)*b*d-32*
x^4*a*d*r+16*b*d*n*x^4-64*a*d*x^4)/(4+r)^2
```

3.368.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. $2(55) = 110$.

Time = 0.31 (sec) , antiderivative size = 159, normalized size of antiderivative = 2.69

$$\int x^3(d+ex^r)\,(a+b\log{(cx^n)})\,\,dx$$
$$=\frac{4\,(bdr^2+8\,bdr+16\,bd)x^4\log{(c)}+4\,(bdnr^2+8\,bdnr+16\,bdn)x^4\log{(x)}-(16\,bdn+(bdn-4\,ad)r^2-64}{16\,(r^2+}$$

input
```
integrate(x^3*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/16*(4*(b*d*r^2 + 8*b*d*r + 16*b*d)*x^4*log(c) + 4*(b*d*n*r^2 + 8*b*d*n*r
 + 16*b*d*n)*x^4*log(x) - (16*b*d*n + (b*d*n - 4*a*d)*r^2 - 64*a*d + 8*(b*
d*n - 4*a*d)*r)*x^4 + 16*((b*e*r + 4*b*e)*x^4*log(c) + (b*e*n*r + 4*b*e*n)
*x^4*log(x) - (b*e*n - a*e*r - 4*a*e)*x^4)*x^r)/(r^2 + 8*r + 16)
```

3.368.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 398 vs. $2(51) = 102$.

Time = 2.86 (sec) , antiderivative size = 398, normalized size of antiderivative = 6.75

$$\int x^3(d+ex^r)\,(a+b\log{(cx^n)})\,\,dx$$
$$=\begin{cases}\frac{4adr^2x^4}{16r^2+128r+256}+\frac{32adrx^4}{16r^2+128r+256}+\frac{64adx^4}{16r^2+128r+256}+\frac{16aerx^4x^r}{16r^2+128r+256}+\frac{64aex^4x^r}{16r^2+128r+256}-\frac{bdnr^2x^4}{16r^2+128r+256}-\frac{8bdnrx^4}{16r^2+128r+25} \\ \frac{adx^4}{4}+\frac{ae\log{(cx^n)}}{n}-\frac{bdnx^4}{16}+\frac{bdx^4\log{(cx^n)}}{4}+\frac{be\log{(cx^n)}^2}{2n}\end{cases}$$

input
```
integrate(x**3*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((4*a*d*r**2*x**4/(16*r**2 + 128*r + 256) + 32*a*d*r*x**4/(16*r**
2 + 128*r + 256) + 64*a*d*x**4/(16*r**2 + 128*r + 256) + 16*a*e*r*x**4*x**
r/(16*r**2 + 128*r + 256) + 64*a*e*x**4*x**r/(16*r**2 + 128*r + 256) - b*d
*n*r**2*x**4/(16*r**2 + 128*r + 256) - 8*b*d*n*r*x**4/(16*r**2 + 128*r + 2
56) - 16*b*d*n*x**4/(16*r**2 + 128*r + 256) + 4*b*d*r**2*x**4*log(c*x**n)/
(16*r**2 + 128*r + 256) + 32*b*d*r*x**4*log(c*x**n)/(16*r**2 + 128*r + 256
) + 64*b*d*x**4*log(c*x**n)/(16*r**2 + 128*r + 256) - 16*b*e*n*x**4*x**r/(
16*r**2 + 128*r + 256) + 16*b*e*r*x**4*x**r*log(c*x**n)/(16*r**2 + 128*r +
 256) + 64*b*e*x**4*x**r*log(c*x**n)/(16*r**2 + 128*r + 256), Ne(r, -4)),
(a*d*x**4/4 + a*e*log(c*x**n)/n - b*d*n*x**4/16 + b*d*x**4*log(c*x**n)/4 +
 b*e*log(c*x**n)**2/(2*n), True))
```

3.368.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 76, normalized size of antiderivative = 1.29

$$\int x^3(d+ex^r)\,(a+b\log{(cx^n)})\;dx = -\frac{1}{16}\,bdnx^4+\frac{1}{4}\,bdx^4\log{(cx^n)}+\frac{1}{4}\,adx^4+\frac{bex^{r+4}\log{(cx^n)}}{r+4}-\frac{benx^{r+4}}{(r+4)^2}+\frac{aex^{r+4}}{r+4}$$

input
```
integrate(x^3*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*d*n*x^4 + 1/4*b*d*x^4*log(c*x^n) + 1/4*a*d*x^4 + b*e*x^(r + 4)*log
(c*x^n)/(r + 4) - b*e*n*x^(r + 4)/(r + 4)^2 + a*e*x^(r + 4)/(r + 4)
```

3.368.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 132 vs. 2(55) = 110.

Time = 0.32 (sec) , antiderivative size = 132, normalized size of antiderivative = 2.24

$$\int x^3(d+ex^r)\,(a+b\log{(cx^n)})\;dx = \frac{benrx^4x^r\log{(x)}}{r^2+8\,r+16}+\frac{4\,benx^4x^r\log{(x)}}{r^2+8\,r+16}+\frac{1}{4}\,bdnx^4\log{(x)}-\frac{benx^4x^r}{r^2+8\,r+16}-\frac{1}{16}\,bdnx^4+\frac{bex^4x^r\log{(c)}}{r+4}+\frac{1}{4}\,bdx^4\log{(c)}+\frac{aex^4x^r}{r+4}+\frac{1}{4}\,adx^4$$

input
```
integrate(x^3*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*n*r*x^4*x^r*log(x)/(r^2 + 8*r + 16) + 4*b*e*n*x^4*x^r*log(x)/(r^2 + 8*
r + 16) + 1/4*b*d*n*x^4*log(x) - b*e*n*x^4*x^r/(r^2 + 8*r + 16) - 1/16*b*d
*n*x^4 + b*e*x^4*x^r*log(c)/(r + 4) + 1/4*b*d*x^4*log(c) + a*e*x^4*x^r/(r
+ 4) + 1/4*a*d*x^4
```

3.368.9 Mupad [F(-1)]

Timed out.

$$\int x^3(d+ex^r)\,(a+b\log(cx^n))\;dx=\int x^3\,(d+e\,x^r)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^3*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int(x^3*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.369 $\int x(d+ex^r)(a+b\log(cx^n))\,dx$

3.369.1 Optimal result

Integrand size = 19, antiderivative size = 59

$$\int x(d+ex^r)(a+b\log(cx^n))\,dx=-\frac{1}{4}bdnx^2-\frac{benx^{2+r}}{(2+r)^2}+\frac{1}{2}\left(dx^2+\frac{2ex^{2+r}}{2+r}\right)(a+b\log(cx^n))$$

output
```
-1/4*b*d*n*x^2-b*e*n*x^(2+r)/(2+r)^2+1/2*(d*x^2+2*e*x^(2+r)/(2+r))*(a+b*ln
(c*x^n))
```

3.369.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.24

$$\int x(d+ex^r)(a+b\log(cx^n))\,dx =\frac{x^2(2a(2+r)(d(2+r)+2ex^r)-bn(d(2+r)^2+4ex^r)+2b(2+r)(d(2+r)+2ex^r)\log(cx^n))}{4(2+r)^2}$$

input
```
Integrate[x*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(2*a*(2 + r)*(d*(2 + r) + 2*e*x^r) - b*n*(d*(2 + r)^2 + 4*e*x^r) + 2*
b*(2 + r)*(d*(2 + r) + 2*e*x^r)*Log[c*x^n]))/(4*(2 + r)^2)
```

3.369.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.211, Rules used = {2771, 27, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex^r)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{2}\left(dx^2+\frac{2ex^{r+2}}{r+2}\right)(a+b\log(cx^n))-bn\int\frac{1}{2}x\left(\frac{2ex^r}{r+2}+d\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\left(dx^2+\frac{2ex^{r+2}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{2}bn\int x\left(\frac{2ex^r}{r+2}+d\right)dx$$

$$\Big\downarrow \text{802}$$

$$\frac{1}{2}\left(dx^2+\frac{2ex^{r+2}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{2}bn\int\left(\frac{2ex^{r+1}}{r+2}+dx\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(dx^2+\frac{2ex^{r+2}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{dx^2}{2}+\frac{2ex^{r+2}}{(r+2)^2}\right)$$

input
```
Int[x*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-1/2*(b*n*((d*x^2)/2 + (2*e*x^(2 + r))/(2 + r)^2)) + ((d*x^2 + (2*e*x^(2 +
 r))/(2 + r))*(a + b*Log[c*x^n]))/2
```

3.369.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.369.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 173 vs. $2(55) = 110$.

Time = 0.36 (sec) , antiderivative size = 174, normalized size of antiderivative = 2.95

method	result
parallelrisch	$-\frac{-4x^2x^r\ln(c\,x^n)ber-2x^2\ln(c\,x^n)bd\,r^2+x^2bdn\,r^2-8x^2x^r\ln(c\,x^n)be-4x^2x^r aer+4x^2x^r ben-8x^2\ln(c\,x^n)bdr-2x^2ad\,r^2+4x^2}{4(r^2+4r+4)}$
risch	$\frac{b\,x^2(dr+2e\,x^r+2d)\ln(x^n)}{4+2r}-\frac{x^2\left(-8x^r ae+4bdn-8ad-4x^r aer+4x^r ben-4i\pi bd\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2-i\pi bd\,r^2\ \mathrm{csgn}(ic)\,\mathrm{csgn}\right.}{}$

input
```
int(x*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-4*x^2*x^r*ln(c*x^n)*b*e*r-2*x^2*ln(c*x^n)*b*d*r^2+x^2*b*d*n*r^2-8*x
^2*x^r*ln(c*x^n)*b*e-4*x^2*x^r*a*e*r+4*x^2*x^r*b*e*n-8*x^2*ln(c*x^n)*b*d*r
-2*x^2*a*d*r^2+4*x^2*b*d*n*r-8*x^2*x^r*a*e-8*x^2*ln(c*x^n)*b*d-8*x^2*a*d*r
+4*b*d*n*x^2-8*a*d*x^2)/(r^2+4*r+4)
```

3.369.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. 2(55) = 110.

Time = 0.32 (sec) , antiderivative size = 159, normalized size of antiderivative = 2.69

$$\int x(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{2\left(bdr^2+4\,bdr+4\,bd\right)x^2\log\left(c\right)+2\left(bdnr^2+4\,bdnr+4\,bdn\right)x^2\log\left(x\right)-\left(4\,bdn+\left(bdn-2\,ad\right)r^2-8\,ad-\right.}{4\left(r^2+4\,r\right.}$$

input
```
integrate(x*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/4*(2*(b*d*r^2 + 4*b*d*r + 4*b*d)*x^2*log(c) + 2*(b*d*n*r^2 + 4*b*d*n*r +
 4*b*d*n)*x^2*log(x) - (4*b*d*n + (b*d*n - 2*a*d)*r^2 - 8*a*d + 4*(b*d*n -
 2*a*d)*r)*x^2 + 4*((b*e*r + 2*b*e)*x^2*log(c) + (b*e*n*r + 2*b*e*n)*x^2*l
og(x) - (b*e*n - a*e*r - 2*a*e)*x^2)*x^r)/(r^2 + 4*r + 4)
```

3.369.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 398 vs. 2(51) = 102.

Time = 0.86 (sec) , antiderivative size = 398, normalized size of antiderivative = 6.75

$$\int x(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\begin{cases}\frac{2adr^2x^2}{4r^2+16r+16}+\frac{8adrx^2}{4r^2+16r+16}+\frac{8adx^2}{4r^2+16r+16}+\frac{4aerx^2x^r}{4r^2+16r+16}+\frac{8aex^2x^r}{4r^2+16r+16}-\frac{bdnr^2x^2}{4r^2+16r+16}-\frac{4bdnrx^2}{4r^2+16r+16}-\frac{4bdnx^2}{4r^2+16r+16}+ \\ \frac{adx^2}{2}+\frac{ae\log\left(cx^n\right)}{n}-\frac{bdnx^2}{4}+\frac{bdx^2\log\left(cx^n\right)}{2}+\frac{be\log\left(cx^n\right)^2}{2n}\end{cases}$$

input
```
integrate(x*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((2*a*d*r**2*x**2/(4*r**2 + 16*r + 16) + 8*a*d*r*x**2/(4*r**2 + 1
6*r + 16) + 8*a*d*x**2/(4*r**2 + 16*r + 16) + 4*a*e*r*x**2*x**r/(4*r**2 +
16*r + 16) + 8*a*e*x**2*x**r/(4*r**2 + 16*r + 16) - b*d*n*r**2*x**2/(4*r**
2 + 16*r + 16) - 4*b*d*n*r*x**2/(4*r**2 + 16*r + 16) - 4*b*d*n*x**2/(4*r**
2 + 16*r + 16) + 2*b*d*r**2*x**2*log(c*x**n)/(4*r**2 + 16*r + 16) + 8*b*d*
r*x**2*log(c*x**n)/(4*r**2 + 16*r + 16) + 8*b*d*x**2*log(c*x**n)/(4*r**2 +
 16*r + 16) - 4*b*e*n*x**2*x**r/(4*r**2 + 16*r + 16) + 4*b*e*r*x**2*x**r*l
og(c*x**n)/(4*r**2 + 16*r + 16) + 8*b*e*x**2*x**r*log(c*x**n)/(4*r**2 + 16
*r + 16), Ne(r, -2)), (a*d*x**2/2 + a*e*log(c*x**n)/n - b*d*n*x**2/4 + b*d
*x**2*log(c*x**n)/2 + b*e*log(c*x**n)**2/(2*n), True))
```

3.369.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 76, normalized size of antiderivative = 1.29

$$\int x(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{1}{4}\,bdnx^2+\frac{1}{2}\,bdx^2\log\left(cx^n\right)+\frac{1}{2}\,adx^2+\frac{bex^{r+2}\log\left(cx^n\right)}{r+2}-\frac{benx^{r+2}}{(r+2)^2}+\frac{aex^{r+2}}{r+2}$$

input
```
integrate(x*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/4*b*d*n*x^2 + 1/2*b*d*x^2*log(c*x^n) + 1/2*a*d*x^2 + b*e*x^(r + 2)*log(
c*x^n)/(r + 2) - b*e*n*x^(r + 2)/(r + 2)^2 + a*e*x^(r + 2)/(r + 2)
```

3.369.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 132 vs. 2(55) = 110.

Time = 0.32 (sec) , antiderivative size = 132, normalized size of antiderivative = 2.24

$$\int x(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{benrx^2x^r\log\left(x\right)}{r^2+4\,r+4}+\frac{2\,benx^2x^r\log\left(x\right)}{r^2+4\,r+4}+\frac{1}{2}\,bdnx^2\log\left(x\right)-\frac{benx^2x^r}{r^2+4\,r+4}-\frac{1}{4}\,bdnx^2+\frac{bex^2x^r\log\left(c\right)}{r+2}+\frac{1}{2}\,bdx^2\log\left(c\right)+\frac{aex^2x^r}{r+2}+\frac{1}{2}\,adx^2$$

input
```
integrate(x*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*n*r*x^2*x^r*log(x)/(r^2 + 4*r + 4) + 2*b*e*n*x^2*x^r*log(x)/(r^2 + 4*r
 + 4) + 1/2*b*d*n*x^2*log(x) - b*e*n*x^2*x^r/(r^2 + 4*r + 4) - 1/4*b*d*n*x
^2 + b*e*x^2*x^r*log(c)/(r + 2) + 1/2*b*d*x^2*log(c) + a*e*x^2*x^r/(r + 2)
 + 1/2*a*d*x^2
```

3.369.9 Mupad [F(-1)]

Timed out.

$$\int x(d+ex^r)(a+b\log(cx^n))\,dx=\int x\,(d+e\,x^r)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int(x*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.370 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx$

3.370.1 Optimal result

Integrand size = 21, antiderivative size = 53

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x}\,dx=-\frac{benx^r}{r^2}+\frac{ex^r(a+b\log(cx^n))}{r}+\frac{d(a+b\log(cx^n))^2}{2bn}$$

output
```
-b*e*n*x^r/r^2+e*x^r*(a+b*ln(c*x^n))/r+1/2*d*(a+b*ln(c*x^n))^2/b/n
```

3.370.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x}\,dx=\frac{e(-bn+ar)x^r}{r^2}+ad\log(x)+\frac{bex^r\log(cx^n)}{r}+\frac{bd\log^2(cx^n)}{2n}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(e*(-(b*n) + a*r)*x^r)/r^2 + a*d*Log[x] + (b*e*x^r*Log[c*x^n])/r + (b*d*Lo
g[c*x^n]^2)/(2*n)
```

3.370.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d(a+b\log(cx^n))}{x}+ex^{r-1}(a+b\log(cx^n))\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{d(a+b\log(cx^n))^2}{2bn}+\frac{ex^r(a+b\log(cx^n))}{r}-\frac{benx^r}{r^2}$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x,x]
```

output
```
-((b*e*n*x^r)/r^2) + (e*x^r*(a + b*Log[c*x^n]))/r + (d*(a + b*Log[c*x^n])^
2)/(2*b*n)
```

3.370.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.370.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.28

method	result
parallelrisch	$\frac{2\ln(x)adn\,r^2+2x^r\ln(c\,x^n)bern+bd\ln(c\,x^n)^2r^2+2x^raenr-2x^rbe\,n^2}{2r^2n}$
risch	$\frac{b(dr\ln(x)+e\,x^r)\ln(x^n)}{r}-\frac{i\ln(x)\pi bd\ \mathrm{csgn}(ic)\ \mathrm{csgn}(ix^n)\ \mathrm{csgn}(ic\,x^n)}{2}+\frac{i\ln(x)\pi bd\ \mathrm{csgn}(ic)\ \mathrm{csgn}(ic\,x^n)^2}{2}+\frac{i\ln(x)\pi bd\ \mathrm{csgn}(}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/2*(2*ln(x)*a*d*n*r^2+2*x^r*ln(c*x^n)*b*e*r*n+b*d*ln(c*x^n)^2*r^2+2*x^r*a
*e*n*r-2*x^r*b*e*n^2)/r^2/n
```

3.370.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx$$
$$=\frac{bdnr^2\log(x)^2+2(benr\log(x)+ber\log(c)-ben+aer)x^r+2(bdr^2\log(c)+adr^2)\log(x)}{2\,r^2}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*(b*d*n*r^2*log(x)^2 + 2*(b*e*n*r*log(x) + b*e*r*log(c) - b*e*n + a*e*r
)*x^r + 2*(b*d*r^2*log(c) + a*d*r^2)*log(x))/r^2
```

3.370.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 131 vs. 2(46) = 92.

Time = 2.28 (sec) , antiderivative size = 131, normalized size of antiderivative = 2.47

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x}\,dx = \begin{cases} (a+b\log{(c)})\,(d+e)\log{(x)} & \text{for } n=0 \wedge r=0 \\ (a+b\log{(c)})\left(d\log{(x)}+\frac{ex^r}{r}\right) & \text{for } n=0 \\ (d+e)\left(\begin{cases} a\log{(x)} & \text{for } b=0 \\ -(-a-b\log{(c)})\log{(x)} & \text{for } n=0 \\ \frac{(-a-b\log{(cx^n)})^2}{2bn} & \text{otherwise} \end{cases}\right) & \text{for } r=0 \\ \frac{ad\log{(cx^n)}}{n}+\frac{aex^r}{r}+\frac{bd\log{(cx^n)}^2}{2n}-\frac{benx^r}{r^2}+\frac{bex^r\log{(cx^n)}}{r} & \text{otherwise} \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise(((a + b*log(c))*(d + e)*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b*lo
g(c))*(d*log(x) + e*x**r/r), Eq(n, 0)), ((d + e)*Piecewise((a*log(x), Eq(b
, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*
n), True)), Eq(r, 0)), (a*d*log(c*x**n)/n + a*e*x**r/r + b*d*log(c*x**n)**
2/(2*n) - b*e*n*x**r/r**2 + b*e*x**r*log(c*x**n)/r, True))
```

3.370.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x}\,dx = \frac{bex^r\log{(cx^n)}}{r}+\frac{bd\log{(cx^n)}^2}{2\,n}+ad\log{(x)}-\frac{benx^r}{r^2}+\frac{aex^r}{r}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
b*e*x^r*log(c*x^n)/r + 1/2*b*d*log(c*x^n)^2/n + a*d*log(x) - b*e*n*x^r/r^2
 + a*e*x^r/r
```

3.370.8 Giac [F]

$$\int \frac{(d + ex^r)(a + b\log(cx^n))}{x} dx = \int \frac{(ex^r + d)(b\log(cx^n) + a)}{x} dx$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)*(b*log(c*x^n) + a)/x, x)
```

3.370.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d + ex^r)(a + b\log(cx^n))}{x} dx = \int \frac{(d + e\,x^r)\,(a + b\,\ln(c\,x^n))}{x} dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x, x)
```

3.371 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx$

3.371.1 Optimal result

Integrand size = 21, antiderivative size = 71

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx = -\frac{bdn}{4x^2}-\frac{benx^{-2+r}}{(2-r)^2}-\frac{d(a+b\log(cx^n))}{2x^2} - \frac{ex^{-2+r}(a+b\log(cx^n))}{2-r}$$

output
```
-1/4*b*d*n/x^2-b*e*n*x^(-2+r)/(2-r)^2-1/2*d*(a+b*ln(c*x^n))/x^2-e*x^(-2+r)
*(a+b*ln(c*x^n))/(2-r)
```

3.371.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx = -\frac{2a(-2+r)(d(-2+r)-2ex^r)+bn(d(-2+r)^2+4ex^r)+2b(-2+r)(d(-2+r)-2ex^r)\log(cx^n)}{4(-2+r)^2x^2}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-1/4*(2*a*(-2 + r)*(d*(-2 + r) - 2*e*x^r) + b*n*(d*(-2 + r)^2 + 4*e*x^r) +
 2*b*(-2 + r)*(d*(-2 + r) - 2*e*x^r)*Log[c*x^n])/((-2 + r)^2*x^2)
```

3.371.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(-\frac{ex^{r-3}}{2-r}-\frac{d}{2x^3}\right)dx-\frac{d(a+b\log(cx^n))}{2x^2}-\frac{ex^{r-2}(a+b\log(cx^n))}{2-r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{2x^2}-\frac{ex^{r-2}(a+b\log(cx^n))}{2-r}-bn\left(\frac{d}{4x^2}+\frac{ex^{r-2}}{(2-r)^2}\right)$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
-(b*n*(d/(4*x^2) + (e*x^(-2 + r))/(2 - r)^2)) - (d*(a + b*Log[c*x^n]))/(2*
x^2) - (e*x^(-2 + r)*(a + b*Log[c*x^n]))/(2 - r)
```

3.371.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.371.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.90

method	result
parallelrisch	$-\frac{-4x^r \ln(c\,x^n)ber+2\ln(c\,x^n)bd\,r^2+bdn\,r^2+8x^r \ln(c\,x^n)be-4x^r aer+4x^r ben-8\ln(c\,x^n)bdr+2ad\,r^2-4bdnr+8x^r ae+8b\ln(c}{4x^2(r^2-4r+4)}$
risch	$-\frac{b(dr-2e\,x^r-2d)\ln(x^n)}{2(-2+r)x^2}-\frac{8x^r ae+4bdn+8ad-4x^r aer+4x^r ben+4i\pi bd\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2+i\pi bd\,r^2\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-4*x^r*ln(c*x^n)*b*e*r+2*ln(c*x^n)*b*d*r^2+b*d*n*r^2+8*x^r*ln(c*x^n)
*b*e-4*x^r*a*e*r+4*x^r*b*e*n-8*ln(c*x^n)*b*d*r+2*a*d*r^2-4*b*d*n*r+8*x^r*a
*e+8*b*ln(c*x^n)*d-8*a*d*r+4*b*d*n+8*a*d)/x^2/(r^2-4*r+4)
```

3.371.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 140 vs. $2(62) = 124$.

Time = 0.31 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex^r)\left(a+b\log\left(cx^n\right)\right)}{x^3}\,dx =$$
$$-\frac{4\,bdn+(bdn+2\,ad)r^2+8\,ad-4\,(bdn+2\,ad)r+4\,(ben-aer+2\,ae-(ber-2\,be)\log\left(c\right)-(benr-}{4\,(r^2-4\,r+4)x^2}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
-1/4*(4*b*d*n + (b*d*n + 2*a*d)*r^2 + 8*a*d - 4*(b*d*n + 2*a*d)*r + 4*(b*e
*n - a*e*r + 2*a*e - (b*e*r - 2*b*e)*log(c) - (b*e*n*r - 2*b*e*n)*log(x))*
x^r + 2*(b*d*r^2 - 4*b*d*r + 4*b*d)*log(c) + 2*(b*d*n*r^2 - 4*b*d*n*r + 4*
b*d*n)*log(x))/((r^2 - 4*r + 4)*x^2)
```

3.371.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 495 vs. $2(63) = 126$.

Time = 2.04 (sec) , antiderivative size = 495, normalized size of antiderivative = 6.97

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^3}\,dx = \begin{cases} -\frac{2adr^2}{4r^2x^2-16rx^2+16x^2} + \frac{8adr}{4r^2x^2-16rx^2+16x^2} - \frac{8ad}{4r^2x^2-16rx^2+16x^2} + \frac{4aerx^r}{4r^2x^2-16rx^2+16x^2} - \frac{8aex^r}{4r^2x^2-16rx^2+16x^2} - \frac{bdnr^2}{4r^2x^2-16rx^2} \\ -\frac{ad}{2x^2} + ae\log(x) + bd\left(-\frac{n}{4x^2} - \frac{\log(cx^n)}{2x^2}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for}\ n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Piecewise((-2*a*d*r**2/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) + 8*a*d*r/(4*r*
*2*x**2 - 16*r*x**2 + 16*x**2) - 8*a*d/(4*r**2*x**2 - 16*r*x**2 + 16*x**2)
 + 4*a*e*r*x**r/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) - 8*a*e*x**r/(4*r**2*x
**2 - 16*r*x**2 + 16*x**2) - b*d*n*r**2/(4*r**2*x**2 - 16*r*x**2 + 16*x**2
) + 4*b*d*n*r/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) - 4*b*d*n/(4*r**2*x**2 -
 16*r*x**2 + 16*x**2) - 2*b*d*r**2*log(c*x**n)/(4*r**2*x**2 - 16*r*x**2 +
16*x**2) + 8*b*d*r*log(c*x**n)/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) - 8*b*d
*log(c*x**n)/(4*r**2*x**2 - 16*r*x**2 + 16*x**2) - 4*b*e*n*x**r/(4*r**2*x*
*2 - 16*r*x**2 + 16*x**2) + 4*b*e*r*x**r*log(c*x**n)/(4*r**2*x**2 - 16*r*x
**2 + 16*x**2) - 8*b*e*x**r*log(c*x**n)/(4*r**2*x**2 - 16*r*x**2 + 16*x**2
), Ne(r, 2)), (-a*d/(2*x**2) + a*e*log(x) + b*d*(-n/(4*x**2) - log(c*x**n)
/(2*x**2)) - b*e*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2
*n), True)), True))
```

3.371.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-3>0)', see `assume?` for more
details)Is
```

3.371.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 389 vs. $2(62) = 124$.

Time = 0.34 (sec) , antiderivative size = 389, normalized size of antiderivative = 5.48

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx = -\frac{bdnr^2\log(x)}{2(r^2-4r+4)x^2} + \frac{benrx^r\log(x)}{(r^2-4r+4)x^2} - \frac{bdnr^2}{4(r^2-4r+4)x^2} - \frac{bdr^2\log(c)}{2(r^2-4r+4)x^2} + \frac{berx^r\log(c)}{(r^2-4r+4)x^2} + \frac{2bdnr\log(x)}{(r^2-4r+4)x^2} - \frac{2benx^r\log(x)}{(r^2-4r+4)x^2} + \frac{bdnr}{(r^2-4r+4)x^2} - \frac{adr^2}{2(r^2-4r+4)x^2} - \frac{benx^r}{(r^2-4r+4)x^2} + \frac{aerx^r}{(r^2-4r+4)x^2} + \frac{2bdr\log(c)}{(r^2-4r+4)x^2} - \frac{2bex^r\log(c)}{(r^2-4r+4)x^2} - \frac{2bdn\log(x)}{(r^2-4r+4)x^2} - \frac{bdn}{(r^2-4r+4)x^2} + \frac{2adr}{(r^2-4r+4)x^2} - \frac{2aex^r}{(r^2-4r+4)x^2} - \frac{2bd\log(c)}{(r^2-4r+4)x^2} - \frac{2ad}{(r^2-4r+4)x^2}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
-1/2*b*d*n*r^2*log(x)/((r^2 - 4*r + 4)*x^2) + b*e*n*r*x^r*log(x)/((r^2 - 4
*r + 4)*x^2) - 1/4*b*d*n*r^2/((r^2 - 4*r + 4)*x^2) - 1/2*b*d*r^2*log(c)/((
r^2 - 4*r + 4)*x^2) + b*e*r*x^r*log(c)/((r^2 - 4*r + 4)*x^2) + 2*b*d*n*r*l
og(x)/((r^2 - 4*r + 4)*x^2) - 2*b*e*n*x^r*log(x)/((r^2 - 4*r + 4)*x^2) + b
*d*n*r/((r^2 - 4*r + 4)*x^2) - 1/2*a*d*r^2/((r^2 - 4*r + 4)*x^2) - b*e*n*x
^r/((r^2 - 4*r + 4)*x^2) + a*e*r*x^r/((r^2 - 4*r + 4)*x^2) + 2*b*d*r*log(c
)/((r^2 - 4*r + 4)*x^2) - 2*b*e*x^r*log(c)/((r^2 - 4*r + 4)*x^2) - 2*b*d*n
*log(x)/((r^2 - 4*r + 4)*x^2) - b*d*n/((r^2 - 4*r + 4)*x^2) + 2*a*d*r/((r^
2 - 4*r + 4)*x^2) - 2*a*e*x^r/((r^2 - 4*r + 4)*x^2) - 2*b*d*log(c)/((r^2 -
 4*r + 4)*x^2) - 2*a*d/((r^2 - 4*r + 4)*x^2)
```

3.371.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(d+e\,x^r)\ (a+b\,\ln(c\,x^n))}{x^3}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^3,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^3, x)
```

3.372 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx$

3.372.1 Optimal result

Integrand size = 21, antiderivative size = 71

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx = -\frac{bdn}{16x^4} - \frac{benx^{-4+r}}{(4-r)^2} - \frac{d(a+b\log(cx^n))}{4x^4} - \frac{ex^{-4+r}(a+b\log(cx^n))}{4-r}$$

output
```
-1/16*b*d*n/x^4-b*e*n*x^(-4+r)/(4-r)^2-1/4*d*(a+b*ln(c*x^n))/x^4-e*x^(-4+r
)*(a+b*ln(c*x^n))/(4-r)
```

3.372.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx = -\frac{4a(-4+r)(d(-4+r)-4ex^r)+bn(d(-4+r)^2+16ex^r)+4b(-4+r)(d(-4+r)-4ex^r)\log(cx^n)}{16(-4+r)^2x^4}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
-1/16*(4*a*(-4 + r)*(d*(-4 + r) - 4*e*x^r) + b*n*(d*(-4 + r)^2 + 16*e*x^r)
 + 4*b*(-4 + r)*(d*(-4 + r) - 4*e*x^r)*Log[c*x^n])/((-4 + r)^2*x^4)
```

3.372.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^5}\,dx$$

$$\Big\downarrow \ 2772$$

$$-bn\int \left(-\frac{ex^{r-5}}{4-r}-\frac{d}{4x^5}\right)dx-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{ex^{r-4}(a+b\log(cx^n))}{4-r}$$

$$\Big\downarrow \ 2009$$

$$-\frac{d(a+b\log(cx^n))}{4x^4}-\frac{ex^{r-4}(a+b\log(cx^n))}{4-r}-bn\left(\frac{d}{16x^4}+\frac{ex^{r-4}}{(4-r)^2}\right)$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
-(b*n*(d/(16*x^4) + (e*x^(-4 + r))/(4 - r)^2)) - (d*(a + b*Log[c*x^n]))/(4
*x^4) - (e*x^(-4 + r)*(a + b*Log[c*x^n]))/(4 - r)
```

3.372.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.372.4 Maple [A] (verified)

Time = 0.38 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.90

method	result
parallelrisch	$-\frac{-16x^r \ln(c\,x^n)ber+4\ln(c\,x^n)bd\,r^2+bdn\,r^2+64x^r \ln(c\,x^n)be-16x^r aer+16x^r ben-32\ln(c\,x^n)bdr+4ad\,r^2-8bdnr+64x^r ae+}{16x^4(r^2-8r+16)}$
risch	$-\frac{b(dr-4e\,x^r-4d)\ln(x^n)}{4(-4+r)x^4}-\frac{64x^r ae+16bdn+64ad-16x^r aer+16x^r ben+32i\pi bd\ \mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2+2i\pi bd\,r^2\ \mathrm{csgn}(ic)\,\mathrm{cs}}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/16*(-16*x^r*ln(c*x^n)*b*e*r+4*ln(c*x^n)*b*d*r^2+b*d*n*r^2+64*x^r*ln(c*x
^n)*b*e-16*x^r*a*e*r+16*x^r*b*e*n-32*ln(c*x^n)*b*d*r+4*a*d*r^2-8*b*d*n*r+6
4*x^r*a*e+64*b*ln(c*x^n)*d-32*a*d*r+16*b*d*n+64*a*d)/x^4/(r^2-8*r+16)
```

3.372.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 140 vs. 2(62) = 124.

Time = 0.30 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^5}\,dx =$$
$$-\frac{16\,bdn+(bdn+4\,ad)r^2+64\,ad-8\,(bdn+4\,ad)r+16\,(ben-aer+4\,ae-(ber-4\,be)\log(c)-(benr}{16\,(r^2-8\,r+16}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
-1/16*(16*b*d*n + (b*d*n + 4*a*d)*r^2 + 64*a*d - 8*(b*d*n + 4*a*d)*r + 16*
(b*e*n - a*e*r + 4*a*e - (b*e*r - 4*b*e)*log(c) - (b*e*n*r - 4*b*e*n)*log(
x))*x^r + 4*(b*d*r^2 - 8*b*d*r + 16*b*d)*log(c) + 4*(b*d*n*r^2 - 8*b*d*n*r
 + 16*b*d*n)*log(x))/((r^2 - 8*r + 16)*x^4)
```

3.372.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 495 vs. $2(63) = 126$.

Time = 3.42 (sec) , antiderivative size = 495, normalized size of antiderivative = 6.97

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx = \begin{cases} -\frac{4adr^2}{16r^2x^4-128rx^4+256x^4} + \frac{32adr}{16r^2x^4-128rx^4+256x^4} - \frac{64ad}{16r^2x^4-128rx^4+256x^4} + \frac{16aerx^r}{16r^2x^4-128rx^4+256x^4} - \frac{64aex^r}{16r^2x^4-128rx^4+256x^4} \\ -\frac{ad}{4x^4} + ae\log(x) + bd\left(-\frac{n}{16x^4} - \frac{\log(cx^n)}{4x^4}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**5,x)
```

output
```
Piecewise((-4*a*d*r**2/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) + 32*a*d*r/(
16*r**2*x**4 - 128*r*x**4 + 256*x**4) - 64*a*d/(16*r**2*x**4 - 128*r*x**4
+ 256*x**4) + 16*a*e*r*x**r/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) - 64*a*
e*x**r/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) - b*d*n*r**2/(16*r**2*x**4 -
 128*r*x**4 + 256*x**4) + 8*b*d*n*r/(16*r**2*x**4 - 128*r*x**4 + 256*x**4)
 - 16*b*d*n/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) - 4*b*d*r**2*log(c*x**n
)/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) + 32*b*d*r*log(c*x**n)/(16*r**2*x
**4 - 128*r*x**4 + 256*x**4) - 64*b*d*log(c*x**n)/(16*r**2*x**4 - 128*r*x*
*4 + 256*x**4) - 16*b*e*n*x**r/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) + 16
*b*e*r*x**r*log(c*x**n)/(16*r**2*x**4 - 128*r*x**4 + 256*x**4) - 64*b*e*x*
*r*log(c*x**n)/(16*r**2*x**4 - 128*r*x**4 + 256*x**4), Ne(r, 4)), (-a*d/(4
*x**4) + a*e*log(x) + b*d*(-n/(16*x**4) - log(c*x**n)/(4*x**4)) - b*e*Piec
ewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)), True))
```

3.372.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-5>0)', see `assume?` for more
details)Is
```

3.372.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 390 vs. $2(62) = 124$.

Time = 0.34 (sec) , antiderivative size = 390, normalized size of antiderivative = 5.49

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^5}\,dx = -\frac{bdnr^2\log(x)}{4(r^2-8r+16)x^4} + \frac{benrx^r\log(x)}{(r^2-8r+16)x^4} - \frac{bdnr^2}{16(r^2-8r+16)x^4} - \frac{bdr^2\log(c)}{4(r^2-8r+16)x^4} + \frac{berx^r\log(c)}{(r^2-8r+16)x^4} + \frac{2bdnr\log(x)}{(r^2-8r+16)x^4} - \frac{4benx^r\log(x)}{(r^2-8r+16)x^4} + \frac{bdnr}{2(r^2-8r+16)x^4} - \frac{adr^2}{4(r^2-8r+16)x^4} - \frac{benx^r}{(r^2-8r+16)x^4} + \frac{aerx^r}{(r^2-8r+16)x^4} + \frac{2bdr\log(c)}{(r^2-8r+16)x^4} - \frac{4bex^r\log(c)}{(r^2-8r+16)x^4} - \frac{4bdn\log(x)}{(r^2-8r+16)x^4} - \frac{bdn}{(r^2-8r+16)x^4} + \frac{2adr}{(r^2-8r+16)x^4} - \frac{4aex^r}{(r^2-8r+16)x^4} - \frac{4bd\log(c)}{(r^2-8r+16)x^4} - \frac{4ad}{(r^2-8r+16)x^4}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
-1/4*b*d*n*r^2*log(x)/((r^2 - 8*r + 16)*x^4) + b*e*n*r*x^r*log(x)/((r^2 -
8*r + 16)*x^4) - 1/16*b*d*n*r^2/((r^2 - 8*r + 16)*x^4) - 1/4*b*d*r^2*log(c
)/((r^2 - 8*r + 16)*x^4) + b*e*r*x^r*log(c)/((r^2 - 8*r + 16)*x^4) + 2*b*d
*n*r*log(x)/((r^2 - 8*r + 16)*x^4) - 4*b*e*n*x^r*log(x)/((r^2 - 8*r + 16)*
x^4) + 1/2*b*d*n*r/((r^2 - 8*r + 16)*x^4) - 1/4*a*d*r^2/((r^2 - 8*r + 16)*
x^4) - b*e*n*x^r/((r^2 - 8*r + 16)*x^4) + a*e*r*x^r/((r^2 - 8*r + 16)*x^4)
 + 2*b*d*r*log(c)/((r^2 - 8*r + 16)*x^4) - 4*b*e*x^r*log(c)/((r^2 - 8*r +
16)*x^4) - 4*b*d*n*log(x)/((r^2 - 8*r + 16)*x^4) - b*d*n/((r^2 - 8*r + 16)
*x^4) + 2*a*d*r/((r^2 - 8*r + 16)*x^4) - 4*a*e*x^r/((r^2 - 8*r + 16)*x^4)
- 4*b*d*log(c)/((r^2 - 8*r + 16)*x^4) - 4*a*d/((r^2 - 8*r + 16)*x^4)
```

3.372.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x^5}\,dx = \int \frac{(d+e\,x^r)\;(a+b\,\ln{(c\,x^n)})}{x^5}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^5,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^5, x)
```

3.373 $\int x^4(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$

3.373.1 Optimal result

Integrand size = 21, antiderivative size = 59

$$\int x^4(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{25}bdnx^5-\frac{benx^{5+r}}{(5+r)^2}+\frac{1}{5}\left(dx^5+\frac{5ex^{5+r}}{5+r}\right)\left(a+b\log\left(cx^n\right)\right)$$

output
```
-1/25*b*d*n*x^5-b*e*n*x^(5+r)/(5+r)^2+1/5*(d*x^5+5*e*x^(5+r)/(5+r))*(a+b*l
n(c*x^n))
```

3.373.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.24

$$\int x^4(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx =\frac{x^5\left(5a(5+r)\left(d(5+r)+5ex^r\right)-bn\left(d(5+r)^2+25ex^r\right)+5b(5+r)\left(d(5+r)+5ex^r\right)\log\left(cx^n\right)\right)}{25(5+r)^2}$$

input
```
Integrate[x^4*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
(x^5*(5*a*(5 + r)*(d*(5 + r) + 5*e*x^r) - b*n*(d*(5 + r)^2 + 25*e*x^r) + 5
*b*(5 + r)*(d*(5 + r) + 5*e*x^r)*Log[c*x^n]))/(25*(5 + r)^2)
```

3.373.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4(d+ex^r)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{5}\left(dx^5+\frac{5ex^{r+5}}{r+5}\right)(a+b\log(cx^n))-bn\int \frac{1}{5}x^4\left(\frac{5ex^r}{r+5}+d\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\left(dx^5+\frac{5ex^{r+5}}{r+5}\right)(a+b\log(cx^n))-\frac{1}{5}bn\int x^4\left(\frac{5ex^r}{r+5}+d\right)dx$$

$$\Big\downarrow \text{802}$$

$$\frac{1}{5}\left(dx^5+\frac{5ex^{r+5}}{r+5}\right)(a+b\log(cx^n))-\frac{1}{5}bn\int \left(\frac{5ex^{r+4}}{r+5}+dx^4\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(dx^5+\frac{5ex^{r+5}}{r+5}\right)(a+b\log(cx^n))-\frac{1}{5}bn\left(\frac{dx^5}{5}+\frac{5ex^{r+5}}{(r+5)^2}\right)$$

input
```
Int[x^4*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-1/5*(b*n*((d*x^5)/5 + (5*e*x^(5 + r))/(5 + r)^2)) + ((d*x^5 + (5*e*x^(5 +
 r))/(5 + r))*(a + b*Log[c*x^n]))/5
```

3.373.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.373.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 168 vs. $2(55) = 110$.

Time = 2.62 (sec) , antiderivative size = 169, normalized size of antiderivative = 2.86

method	result
parallelrisch	$-\frac{-25x^5x^r\ln(c\,x^n)ber-5x^5\ln(c\,x^n)bd\,r^2+x^5bdn\,r^2-125x^5x^r\ln(c\,x^n)be-25x^5x^raer+25x^5x^rben-50x^5\ln(c\,x^n)bdr-5x^5ad}{25(5+r)^2}$
risch	$\frac{b\,x^5(dr+5e\,x^r+5d)\ln(x^n)}{25+5r}-\frac{x^5\left(-250x^rae+50bdn-250ad-50x^raer+50x^rben-125i\pi bd\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2-5i\pi bd\,r^2\,c\right.}{}$

input
```
int(x^4*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/25*(-25*x^5*x^r*ln(c*x^n)*b*e*r-5*x^5*ln(c*x^n)*b*d*r^2+x^5*b*d*n*r^2-1
25*x^5*x^r*ln(c*x^n)*b*e-25*x^5*x^r*a*e*r+25*x^5*x^r*b*e*n-50*x^5*ln(c*x^n
)*b*d*r-5*x^5*a*d*r^2+10*x^5*b*d*n*r-125*x^5*x^r*a*e-125*x^5*b*ln(c*x^n)*d
-50*x^5*a*d*r+25*b*d*n*x^5-125*x^5*a*d)/(5+r)^2
```

3.373.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. $2(55) = 110$.

Time = 0.30 (sec) , antiderivative size = 159, normalized size of antiderivative = 2.69

$$\int x^4(d+ex^r)(a+b\log(cx^n))\,dx$$
$$= \frac{5\,(bdr^2+10\,bdr+25\,bd)x^5\log(c)+5\,(bdnr^2+10\,bdnr+25\,bdn)x^5\log(x)-(25\,bdn+(bdn-5\,ad)r^2-}{25\,(r^2}$$

input
```
integrate(x^4*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/25*(5*(b*d*r^2 + 10*b*d*r + 25*b*d)*x^5*log(c) + 5*(b*d*n*r^2 + 10*b*d*n
*r + 25*b*d*n)*x^5*log(x) - (25*b*d*n + (b*d*n - 5*a*d)*r^2 - 125*a*d + 10
*(b*d*n - 5*a*d)*r)*x^5 + 25*((b*e*r + 5*b*e)*x^5*log(c) + (b*e*n*r + 5*b*
e*n)*x^5*log(x) - (b*e*n - a*e*r - 5*a*e)*x^5)*x^r)/(r^2 + 10*r + 25)
```

3.373.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 398 vs. $2(51) = 102$.

Time = 5.03 (sec) , antiderivative size = 398, normalized size of antiderivative = 6.75

$$\int x^4(d+ex^r)(a+b\log(cx^n))\,dx$$
$$= \begin{cases} \frac{5adr^2x^5}{25r^2+250r+625}+\frac{50adrx^5}{25r^2+250r+625}+\frac{125adx^5}{25r^2+250r+625}+\frac{25aerx^5x^r}{25r^2+250r+625}+\frac{125aex^5x^r}{25r^2+250r+625}-\frac{bdnr^2x^5}{25r^2+250r+625}-\frac{10bdnrx^5}{25r^2+250r+62} \\ \frac{adx^5}{5}+\frac{ae\log(cx^n)}{n}-\frac{bdnx^5}{25}+\frac{bdx^5\log(cx^n)}{5}+\frac{be\log(cx^n)^2}{2n} \end{cases}$$

input
```
integrate(x**4*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((5*a*d*r**2*x**5/(25*r**2 + 250*r + 625) + 50*a*d*r*x**5/(25*r**
2 + 250*r + 625) + 125*a*d*x**5/(25*r**2 + 250*r + 625) + 25*a*e*r*x**5*x*
*r/(25*r**2 + 250*r + 625) + 125*a*e*x**5*x**r/(25*r**2 + 250*r + 625) - b
*d*n*r**2*x**5/(25*r**2 + 250*r + 625) - 10*b*d*n*r*x**5/(25*r**2 + 250*r
+ 625) - 25*b*d*n*x**5/(25*r**2 + 250*r + 625) + 5*b*d*r**2*x**5*log(c*x**
n)/(25*r**2 + 250*r + 625) + 50*b*d*r*x**5*log(c*x**n)/(25*r**2 + 250*r +
625) + 125*b*d*x**5*log(c*x**n)/(25*r**2 + 250*r + 625) - 25*b*e*n*x**5*x*
*r/(25*r**2 + 250*r + 625) + 25*b*e*r*x**5*x**r*log(c*x**n)/(25*r**2 + 250
*r + 625) + 125*b*e*x**5*x**r*log(c*x**n)/(25*r**2 + 250*r + 625), Ne(r, -
5)), (a*d*x**5/5 + a*e*log(c*x**n)/n - b*d*n*x**5/25 + b*d*x**5*log(c*x**n
)/5 + b*e*log(c*x**n)**2/(2*n), True))
```

3.373.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 76, normalized size of antiderivative = 1.29

$$\int x^4(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{25}\,bdnx^5+\frac{1}{5}\,bdx^5\log\left(cx^n\right)+\frac{1}{5}\,adx^5+\frac{bex^{r+5}\log\left(cx^n\right)}{r+5}-\frac{benx^{r+5}}{\left(r+5\right)^2}+\frac{aex^{r+5}}{r+5}$$

input
```
integrate(x^4*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*d*n*x^5 + 1/5*b*d*x^5*log(c*x^n) + 1/5*a*d*x^5 + b*e*x^(r + 5)*log
(c*x^n)/(r + 5) - b*e*n*x^(r + 5)/(r + 5)^2 + a*e*x^(r + 5)/(r + 5)
```

3.373.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 132 vs. 2(55) = 110.

Time = 0.31 (sec) , antiderivative size = 132, normalized size of antiderivative = 2.24

$$\int x^4(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{benrx^5x^r\log\left(x\right)}{r^2+10\,r+25}+\frac{5\,benx^5x^r\log\left(x\right)}{r^2+10\,r+25}+\frac{1}{5}\,bdnx^5\log\left(x\right)-\frac{benx^5x^r}{r^2+10\,r+25}-\frac{1}{25}\,bdnx^5+\frac{bex^5x^r\log\left(c\right)}{r+5}+\frac{1}{5}\,bdx^5\log\left(c\right)+\frac{aex^5x^r}{r+5}+\frac{1}{5}\,adx^5$$

input
```
integrate(x^4*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*n*r*x^5*x^r*log(x)/(r^2 + 10*r + 25) + 5*b*e*n*x^5*x^r*log(x)/(r^2 + 1
0*r + 25) + 1/5*b*d*n*x^5*log(x) - b*e*n*x^5*x^r/(r^2 + 10*r + 25) - 1/25*
b*d*n*x^5 + b*e*x^5*x^r*log(c)/(r + 5) + 1/5*b*d*x^5*log(c) + a*e*x^5*x^r/
(r + 5) + 1/5*a*d*x^5
```

3.373.9 Mupad [F(-1)]

Timed out.

$$\int x^4(d+ex^r)\,(a+b\log{(cx^n)})\,\,dx=\int x^4\,(d+e\,x^r)\,\,(a+b\,\ln{(c\,x^n)})\,\,dx$$

input
```
int(x^4*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int(x^4*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.374 $\int x^2(d+ex^r)(a+b\log(cx^n))\,dx$

3.374.1 Optimal result

Integrand size = 21, antiderivative size = 59

$$\int x^2(d+ex^r)(a+b\log(cx^n))\,dx=-\frac{1}{9}bdnx^3-\frac{benx^{3+r}}{(3+r)^2}+\frac{1}{3}\left(dx^3+\frac{3ex^{3+r}}{3+r}\right)(a+b\log(cx^n))$$

output
```
-1/9*b*d*n*x^3-b*e*n*x^(3+r)/(3+r)^2+1/3*(d*x^3+3*e*x^(3+r)/(3+r))*(a+b*ln
(c*x^n))
```

3.374.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 73, normalized size of antiderivative = 1.24

$$\int x^2(d+ex^r)(a+b\log(cx^n))\,dx=\frac{x^3(3a(3+r)(d(3+r)+3ex^r)-bn(d(3+r)^2+9ex^r)+3b(3+r)(d(3+r)+3ex^r)\log(cx^n))}{9(3+r)^2}$$

input
```
Integrate[x^2*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
(x^3*(3*a*(3 + r)*(d*(3 + r) + 3*e*x^r) - b*n*(d*(3 + r)^2 + 9*e*x^r) + 3*
b*(3 + r)*(d*(3 + r) + 3*e*x^r)*Log[c*x^n]))/(9*(3 + r)^2)
```

3.374.3 Rubi [A] (verified)

Time = 0.28 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.05, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex^r)\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{3}\left(dx^3+\frac{3ex^{r+3}}{r+3}\right)\left(a+b\log\left(cx^n\right)\right)-bn\int \frac{1}{3}x^2\left(\frac{3ex^r}{r+3}+d\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}\left(dx^3+\frac{3ex^{r+3}}{r+3}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{3}bn\int x^2\left(\frac{3ex^r}{r+3}+d\right)dx$$

$$\Big\downarrow \text{802}$$

$$\frac{1}{3}\left(dx^3+\frac{3ex^{r+3}}{r+3}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{3}bn\int \left(\frac{3ex^{r+2}}{r+3}+dx^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}\left(dx^3+\frac{3ex^{r+3}}{r+3}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{3}bn\left(\frac{dx^3}{3}+\frac{3ex^{r+3}}{(r+3)^2}\right)$$

input
```
Int[x^2*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-1/3*(b*n*((d*x^3)/3 + (3*e*x^(3 + r))/(3 + r)^2)) + ((d*x^3 + (3*e*x^(3 +
 r))/(3 + r))*(a + b*Log[c*x^n]))/3
```

3.374.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.374.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 168 vs. $2(55) = 110$.

Time = 0.70 (sec) , antiderivative size = 169, normalized size of antiderivative = 2.86

method	result
parallelrisch	$-\frac{-9x^3x^r\ln(c\,x^n)ber-3x^3\ln(c\,x^n)bd\,r^2+x^3bdn\,r^2-27x^3x^r\ln(c\,x^n)be-9x^3x^r aer+9x^3x^r ben-18x^3\ln(c\,x^n)bdr-3x^3ad\,r^2+6}{9(3+r)^2}$
risch	$\frac{b\,x^3(dr+3e\,x^r+3d)\ln(x^n)}{9+3r}-\frac{x^3\left(-54x^r ae+18bdn-54ad-18x^r aer+18x^r ben-27i\pi bd\,\operatorname{csgn}(ix^n)\operatorname{csgn}(ic\,x^n)^2-3i\pi bd\,r^2\operatorname{csgn}\right.}{}$

input
```
int(x^2*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/9*(-9*x^3*x^r*ln(c*x^n)*b*e*r-3*x^3*ln(c*x^n)*b*d*r^2+x^3*b*d*n*r^2-27*
x^3*x^r*ln(c*x^n)*b*e-9*x^3*x^r*a*e*r+9*x^3*x^r*b*e*n-18*x^3*ln(c*x^n)*b*d
*r-3*x^3*a*d*r^2+6*x^3*b*d*n*r-27*x^3*x^r*a*e-27*x^3*ln(c*x^n)*b*d-18*x^3*
a*d*r+9*b*d*n*x^3-27*x^3*a*d)/(3+r)^2
```

3.374.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. $2(55) = 110$.

Time = 0.31 (sec) , antiderivative size = 159, normalized size of antiderivative = 2.69

$$\int x^2(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \frac{3\left(bdr^2+6\,bdr+9\,bd\right)x^3\log\left(c\right)+3\left(bdnr^2+6\,bdnr+9\,bdn\right)x^3\log\left(x\right)-\left(9\,bdn+\left(bdn-3\,ad\right)r^2-27\,ad\right.}{9\left(r^2+6\,r\right.}$$

input
```
integrate(x^2*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/9*(3*(b*d*r^2 + 6*b*d*r + 9*b*d)*x^3*log(c) + 3*(b*d*n*r^2 + 6*b*d*n*r +
 9*b*d*n)*x^3*log(x) - (9*b*d*n + (b*d*n - 3*a*d)*r^2 - 27*a*d + 6*(b*d*n
- 3*a*d)*r)*x^3 + 9*((b*e*r + 3*b*e)*x^3*log(c) + (b*e*n*r + 3*b*e*n)*x^3*
log(x) - (b*e*n - a*e*r - 3*a*e)*x^3)*x^r)/(r^2 + 6*r + 9)
```

3.374.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 398 vs. $2(51) = 102$.

Time = 1.51 (sec) , antiderivative size = 398, normalized size of antiderivative = 6.75

$$\int x^2(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$= \begin{cases} \frac{3adr^2x^3}{9r^2+54r+81}+\frac{18adrx^3}{9r^2+54r+81}+\frac{27adx^3}{9r^2+54r+81}+\frac{9aerx^3x^r}{9r^2+54r+81}+\frac{27aex^3x^r}{9r^2+54r+81}-\frac{bdnr^2x^3}{9r^2+54r+81}-\frac{6bdnrx^3}{9r^2+54r+81}-\frac{9bdnx^3}{9r^2+54r+81}+ \\ \frac{adx^3}{3}+\frac{ae\log\left(cx^n\right)}{n}-\frac{bdnx^3}{9}+\frac{bdx^3\log\left(cx^n\right)}{3}+\frac{be\log\left(cx^n\right)^2}{2n} \end{cases}$$

input
```
integrate(x**2*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((3*a*d*r**2*x**3/(9*r**2 + 54*r + 81) + 18*a*d*r*x**3/(9*r**2 +
54*r + 81) + 27*a*d*x**3/(9*r**2 + 54*r + 81) + 9*a*e*r*x**3*x**r/(9*r**2
+ 54*r + 81) + 27*a*e*x**3*x**r/(9*r**2 + 54*r + 81) - b*d*n*r**2*x**3/(9*
r**2 + 54*r + 81) - 6*b*d*n*r*x**3/(9*r**2 + 54*r + 81) - 9*b*d*n*x**3/(9*
r**2 + 54*r + 81) + 3*b*d*r**2*x**3*log(c*x**n)/(9*r**2 + 54*r + 81) + 18*
b*d*r*x**3*log(c*x**n)/(9*r**2 + 54*r + 81) + 27*b*d*x**3*log(c*x**n)/(9*r
**2 + 54*r + 81) - 9*b*e*n*x**3*x**r/(9*r**2 + 54*r + 81) + 9*b*e*r*x**3*x
**r*log(c*x**n)/(9*r**2 + 54*r + 81) + 27*b*e*x**3*x**r*log(c*x**n)/(9*r**
2 + 54*r + 81), Ne(r, -3)), (a*d*x**3/3 + a*e*log(c*x**n)/n - b*d*n*x**3/9
 + b*d*x**3*log(c*x**n)/3 + b*e*log(c*x**n)**2/(2*n), True))
```

3.374.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 76, normalized size of antiderivative = 1.29

$$\int x^2(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=-\frac{1}{9}\,bdnx^3+\frac{1}{3}\,bdx^3\log\left(cx^n\right)+\frac{1}{3}\,adx^3+\frac{bex^{r+3}\log\left(cx^n\right)}{r+3}-\frac{benx^{r+3}}{(r+3)^2}+\frac{aex^{r+3}}{r+3}$$

input
```
integrate(x^2*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/9*b*d*n*x^3 + 1/3*b*d*x^3*log(c*x^n) + 1/3*a*d*x^3 + b*e*x^(r + 3)*log(
c*x^n)/(r + 3) - b*e*n*x^(r + 3)/(r + 3)^2 + a*e*x^(r + 3)/(r + 3)
```

3.374.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 132 vs. 2(55) = 110.

Time = 0.34 (sec) , antiderivative size = 132, normalized size of antiderivative = 2.24

$$\int x^2(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=\frac{benrx^3x^r\log\left(x\right)}{r^2+6\,r+9}+\frac{3\,benx^3x^r\log\left(x\right)}{r^2+6\,r+9}+\frac{1}{3}\,bdnx^3\log\left(x\right)-\frac{benx^3x^r}{r^2+6\,r+9}-\frac{1}{9}\,bdnx^3+\frac{bex^3x^r\log\left(c\right)}{r+3}+\frac{1}{3}\,bdx^3\log\left(c\right)+\frac{aex^3x^r}{r+3}+\frac{1}{3}\,adx^3$$

input
```
integrate(x^2*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*n*r*x^3*x^r*log(x)/(r^2 + 6*r + 9) + 3*b*e*n*x^3*x^r*log(x)/(r^2 + 6*r
 + 9) + 1/3*b*d*n*x^3*log(x) - b*e*n*x^3*x^r/(r^2 + 6*r + 9) - 1/9*b*d*n*x
^3 + b*e*x^3*x^r*log(c)/(r + 3) + 1/3*b*d*x^3*log(c) + a*e*x^3*x^r/(r + 3)
 + 1/3*a*d*x^3
```

3.374.9 Mupad [F(-1)]

Timed out.

$$\int x^2(d+ex^r)\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^2\,\left(d+e\,x^r\right)\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^2*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int(x^2*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.375 $\int (d+ex^r)(a+b\log(cx^n))\,dx$

3.375.1 Optimal result

Integrand size = 18, antiderivative size = 57

$$\int (d+ex^r)(a+b\log(cx^n))\,dx = -bdnx-\frac{benx^{1+r}}{(1+r)^2}+dx(a+b\log(cx^n)) + \frac{ex^{1+r}(a+b\log(cx^n))}{1+r}$$

output
```
-b*d*n*x-b*e*n*x^(1+r)/(1+r)^2+d*x*(a+b*ln(c*x^n))+e*x^(1+r)*(a+b*ln(c*x^n
))/(1+r)
```

3.375.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.93

$$\int (d+ex^r)(a+b\log(cx^n))\,dx = x\left(ad-bdn-\frac{benx^r}{(1+r)^2}+bd\log(cx^n)+\frac{ex^r(a+b\log(cx^n))}{1+r}\right)$$

input
```
Integrate[(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
x*(a*d - b*d*n - (b*e*n*x^r)/(1 + r)^2 + b*d*Log[c*x^n] + (e*x^r*(a + b*Lo
g[c*x^n]))/(1 + r))
```

3.375.3 Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.12, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {2750, 27, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^r)(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2750}$$

$$-bn\int \frac{ex^r+d(r+1)}{r+1}dx+dx(a+b\log(cx^n))+\frac{ex^{r+1}(a+b\log(cx^n))}{r+1}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int (ex^r+d(r+1))\,dx}{r+1}+dx(a+b\log(cx^n))+\frac{ex^{r+1}(a+b\log(cx^n))}{r+1}$$

$$\Big\downarrow \text{2009}$$

$$dx(a+b\log(cx^n))+\frac{ex^{r+1}(a+b\log(cx^n))}{r+1}-\frac{bn\left(d(r+1)x+\frac{ex^{r+1}}{r+1}\right)}{r+1}$$

input
```
Int[(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*(d*(1 + r)*x + (e*x^(1 + r))/(1 + r)))/(1 + r)) + d*x*(a + b*Log[c*
x^n]) + (e*x^(1 + r)*(a + b*Log[c*x^n]))/(1 + r)
```

3.375.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

3.375.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 143 vs. $2(57) = 114$.

Time = 0.19 (sec) , antiderivative size = 144, normalized size of antiderivative = 2.53

method	result
parallelrisch	$-\frac{-x\,x^{r}\ln(c\,x^{n})ber-x\ln(c\,x^{n})bd\,r^{2}+xbdn\,r^{2}-x\,x^{r}\ln(c\,x^{n})be-x\,x^{r}aer+x\,x^{r}ben-2x\ln(c\,x^{n})bdr-xad\,r^{2}+2xbdnr-x\,x^{r}ae-}{r^{2}+2r+1}$
risch	$\frac{bx(dr+e\,x^{r}+d)\ln(x^{n})}{1+r}-\frac{x\left(-2x^{r}ae+2bdn-2ad-2x^{r}aer+2x^{r}ben-i\pi bd\,\mathrm{csgn}(ix^{n})\,\mathrm{csgn}(ic\,x^{n})^{2}-i\pi bd\,r^{2}\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^{n}\right.}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-x*x^r*ln(c*x^n)*b*e*r-x*ln(c*x^n)*b*d*r^2+x*b*d*n*r^2-x*x^r*ln(c*x^n)*b
*e-x*x^r*a*e*r+x*x^r*b*e*n-2*x*ln(c*x^n)*b*d*r-x*a*d*r^2+2*x*b*d*n*r-x*x^r
*a*e-x*ln(c*x^n)*b*d-2*x*a*d*r+b*d*n*x-x*a*d)/(r^2+2*r+1)
```

3.375.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 138 vs. $2(57) = 114$.

Time = 0.28 (sec) , antiderivative size = 138, normalized size of antiderivative = 2.42

$$\int \left(d+ex^{r}\right)\left(a+b\log\left(cx^{n}\right)\right)\,dx$$
$$=\frac{(bdr^{2}+2\,bdr+bd)x\log\left(c\right)+(bdnr^{2}+2\,bdnr+bdn)x\log\left(x\right)-(bdn+(bdn-ad)r^{2}-ad+2\,(bdn-ad}{r^{2}+2\,r+1}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((b*d*r^2 + 2*b*d*r + b*d)*x*log(c) + (b*d*n*r^2 + 2*b*d*n*r + b*d*n)*x*lo
g(x) - (b*d*n + (b*d*n - a*d)*r^2 - a*d + 2*(b*d*n - a*d)*r)*x + ((b*e*r +
 b*e)*x*log(c) + (b*e*n*r + b*e*n)*x*log(x) - (b*e*n - a*e*r - a*e)*x)*x^r
)/(r^2 + 2*r + 1)
```

3.375.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 323 vs. $2(54) = 108$.

Time = 0.47 (sec) , antiderivative size = 323, normalized size of antiderivative = 5.67

$$\int (d+ex^r)(a+b\log(cx^n))\,dx$$
$$= \begin{cases} \frac{adr^2x}{r^2+2r+1} + \frac{2adrx}{r^2+2r+1} + \frac{adx}{r^2+2r+1} + \frac{aerxx^r}{r^2+2r+1} + \frac{aexx^r}{r^2+2r+1} - \frac{bdnr^2x}{r^2+2r+1} - \frac{2bdnrx}{r^2+2r+1} - \frac{bdnx}{r^2+2r+1} + \frac{bdr^2x\log(cx^n)}{r^2+2r+1} + \frac{2bdrx\log}{r^2+2r} \\ adx + \frac{ae\log(cx^n)}{n} - bdnx + bdx\log(cx^n) + \frac{be\log(cx^n)^2}{2n} \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d*r**2*x/(r**2 + 2*r + 1) + 2*a*d*r*x/(r**2 + 2*r + 1) + a*d*
x/(r**2 + 2*r + 1) + a*e*r*x*x**r/(r**2 + 2*r + 1) + a*e*x*x**r/(r**2 + 2*
r + 1) - b*d*n*r**2*x/(r**2 + 2*r + 1) - 2*b*d*n*r*x/(r**2 + 2*r + 1) - b*
d*n*x/(r**2 + 2*r + 1) + b*d*r**2*x*log(c*x**n)/(r**2 + 2*r + 1) + 2*b*d*r
*x*log(c*x**n)/(r**2 + 2*r + 1) + b*d*x*log(c*x**n)/(r**2 + 2*r + 1) - b*e
*n*x*x**r/(r**2 + 2*r + 1) + b*e*r*x*x**r*log(c*x**n)/(r**2 + 2*r + 1) + b
*e*x*x**r*log(c*x**n)/(r**2 + 2*r + 1), Ne(r, -1)), (a*d*x + a*e*log(c*x**
n)/n - b*d*n*x + b*d*x*log(c*x**n) + b*e*log(c*x**n)**2/(2*n), True))
```

3.375.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.19

$$\int (d+ex^r)(a+b\log(cx^n))\,dx = -bdnx + bdx\log(cx^n) + adx + \frac{bex^{r+1}\log(cx^n)}{r+1} - \frac{benx^{r+1}}{(r+1)^2} + \frac{aex^{r+1}}{r+1}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*d*n*x + b*d*x*log(c*x^n) + a*d*x + b*e*x^(r + 1)*log(c*x^n)/(r + 1) - b
*e*n*x^(r + 1)/(r + 1)^2 + a*e*x^(r + 1)/(r + 1)
```

3.375.8 Giac [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 110, normalized size of antiderivative = 1.93

$$\int (d+ex^r)(a+b\log(cx^n))\,dx = \frac{benrxx^r\log(x)}{r^2+2r+1} + bdnx\log(x) + \frac{benxx^r\log(x)}{r^2+2r+1} - bdnx - \frac{benxx^r}{r^2+2r+1} + bdx\log(c) + \frac{bexx^r\log(c)}{r+1} + adx + \frac{aexx^r}{r+1}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*n*r*x*x^r*log(x)/(r^2 + 2*r + 1) + b*d*n*x*log(x) + b*e*n*x*x^r*log(x)
/(r^2 + 2*r + 1) - b*d*n*x - b*e*n*x*x^r/(r^2 + 2*r + 1) + b*d*x*log(c) +
b*e*x*x^r*log(c)/(r + 1) + a*d*x + a*e*x*x^r/(r + 1)
```

3.375.9 Mupad [F(-1)]

Timed out.

$$\int (d+ex^r)(a+b\log(cx^n))\,dx = \int (d+e\,x^r)\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int((d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.376 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx$

3.376.1 Optimal result

Integrand size = 21, antiderivative size = 67

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^2}\,dx=-\frac{bdn}{x}-\frac{benx^{-1+r}}{(1-r)^2}-\frac{d(a+b\log(cx^n))}{x}-\frac{ex^{-1+r}(a+b\log(cx^n))}{1-r}$$

output
```
-b*d*n/x-b*e*n*x^(-1+r)/(1-r)^2-d*(a+b*ln(c*x^n))/x-e*x^(-1+r)*(a+b*ln(c*x
^n))/(1-r)
```

3.376.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 67, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))}{x^2}\,dx=-\frac{a(-1+r)\,(d(-1+r)-ex^r)+bn(d(-1+r)^2+ex^r)+b(-1+r)\,(d(-1+r)-ex^r)\log(cx^n)}{(-1+r)^2x}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
-((a*(-1 + r)*(d*(-1 + r) - e*x^r) + b*n*(d*(-1 + r)^2 + e*x^r) + b*(-1 +
r)*(d*(-1 + r) - e*x^r)*Log[c*x^n])/((-1 + r)^2*x))
```

3.376.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 79, normalized size of antiderivative = 1.18, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {2772, 25, 27, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{ex^r+d(1-r)}{(1-r)x^2}dx-\frac{d(a+b\log(cx^n))}{x}-\frac{ex^{r-1}(a+b\log(cx^n))}{1-r}$$

$$\Big\downarrow \text{25}$$

$$bn\int \frac{ex^r+d(1-r)}{(1-r)x^2}dx-\frac{d(a+b\log(cx^n))}{x}-\frac{ex^{r-1}(a+b\log(cx^n))}{1-r}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int \frac{ex^r+d(1-r)}{x^2}dx}{1-r}-\frac{d(a+b\log(cx^n))}{x}-\frac{ex^{r-1}(a+b\log(cx^n))}{1-r}$$

$$\Big\downarrow \text{802}$$

$$\frac{bn\int \left(ex^{r-2}+\frac{d-dr}{x^2}\right)dx}{1-r}-\frac{d(a+b\log(cx^n))}{x}-\frac{ex^{r-1}(a+b\log(cx^n))}{1-r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{x}-\frac{ex^{r-1}(a+b\log(cx^n))}{1-r}+\frac{bn\left(-\frac{d(1-r)}{x}-\frac{ex^{r-1}}{1-r}\right)}{1-r}$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
(b*n*(-((d*(1 - r))/x) - (e*x^(-1 + r))/(1 - r)))/(1 - r) - (d*(a + b*Log[
c*x^n]))/x - (e*x^(-1 + r)*(a + b*Log[c*x^n]))/(1 - r)
```

3.376.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.376.4 Maple [A] (verified)

Time = 0.21 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.90

method	result
parallelrisch	$-\frac{-x^{r} \ln \left(c \,x^{n}\right) b e r +\ln \left(c \,x^{n}\right) b d \,r^{2}+b d n \,r^{2}+x^{r} \ln \left(c \,x^{n}\right) b e -x^{r} a e r +x^{r} b e n -2 \ln \left(c \,x^{n}\right) b d r +a d \,r^{2}-2 b d n r +x^{r} a e +b \ln \left(c \,x^{n}\right) d -2 a d}{x \left(r^{2}-2 r +1\right)}$
risch	$-\frac{b \left(d r -e \,x^{r}-d \right) \ln \left(x^{n}\right)}{\left(-1+r \right) x}-\frac{2 x^{r} a e +2 b d n +2 a d -2 x^{r} a e r +2 x^{r} b e n +i \pi b d \,\operatorname{csgn}\left(i x^{n}\right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}+i \pi b d \,r^{2} \operatorname{csgn}\left(i c \right) \operatorname{csgn}\left(i c \,x^{n}\right)^{2}+}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-(-x^r*ln(c*x^n)*b*e*r+ln(c*x^n)*b*d*r^2+b*d*n*r^2+x^r*ln(c*x^n)*b*e-x^r*a
*e*r+x^r*b*e*n-2*ln(c*x^n)*b*d*r+a*d*r^2-2*b*d*n*r+x^r*a*e+b*ln(c*x^n)*d-2
*a*d*r+b*d*n+a*d)/x/(r^2-2*r+1)
```

3.376.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 130 vs. 2(62) = 124.

Time = 0.29 (sec) , antiderivative size = 130, normalized size of antiderivative = 1.94

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx = -\frac{bdn+(bdn+ad)r^2+ad-2(bdn+ad)r+(ben-aer+ae-(ber-be)\log(c)-(benr-ben)\log(x)}{(r^2-2r+1)x}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
-(b*d*n + (b*d*n + a*d)*r^2 + a*d - 2*(b*d*n + a*d)*r + (b*e*n - a*e*r + a
*e - (b*e*r - b*e)*log(c) - (b*e*n*r - b*e*n)*log(x))*x^r + (b*d*r^2 - 2*b
*d*r + b*d)*log(c) + (b*d*n*r^2 - 2*b*d*n*r + b*d*n)*log(x))/((r^2 - 2*r +
 1)*x)
```

3.376.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 348 vs. 2(56) = 112.

Time = 2.18 (sec) , antiderivative size = 348, normalized size of antiderivative = 5.19

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx = \begin{cases} -\frac{adr^2}{r^2x-2rx+x}+\frac{2adr}{r^2x-2rx+x}-\frac{ad}{r^2x-2rx+x}+\frac{aerx^r}{r^2x-2rx+x}-\frac{aex^r}{r^2x-2rx+x}-\frac{bdnr^2}{r^2x-2rx+x}+\frac{2bdnr}{r^2x-2rx+x}-\frac{bdn}{r^2x-2rx+x}-\frac{bdr^2}{r^2x} \\ -\frac{ad}{x}+ae\log(x)+bd\left(-\frac{n}{x}-\frac{\log(cx^n)}{x}\right)-be\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**2,x)
```

output
```
Piecewise((-a*d*r**2/(r**2*x - 2*r*x + x) + 2*a*d*r/(r**2*x - 2*r*x + x) -
 a*d/(r**2*x - 2*r*x + x) + a*e*r*x**r/(r**2*x - 2*r*x + x) - a*e*x**r/(r*
*2*x - 2*r*x + x) - b*d*n*r**2/(r**2*x - 2*r*x + x) + 2*b*d*n*r/(r**2*x -
2*r*x + x) - b*d*n/(r**2*x - 2*r*x + x) - b*d*r**2*log(c*x**n)/(r**2*x - 2
*r*x + x) + 2*b*d*r*log(c*x**n)/(r**2*x - 2*r*x + x) - b*d*log(c*x**n)/(r*
*2*x - 2*r*x + x) - b*e*n*x**r/(r**2*x - 2*r*x + x) + b*e*r*x**r*log(c*x**
n)/(r**2*x - 2*r*x + x) - b*e*x**r*log(c*x**n)/(r**2*x - 2*r*x + x), Ne(r,
 1)), (-a*d/x + a*e*log(x) + b*d*(-n/x - log(c*x**n)/x) - b*e*Piecewise((-
log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)), True))
```

3.376.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x^2}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-2>0)', see `assume?` for more
details)Is
```

3.376.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 186 vs. $2(62) = 124$.

Time = 0.38 (sec) , antiderivative size = 186, normalized size of antiderivative = 2.78

$$\begin{aligned}\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x^2}\,dx = {} & \frac{benrx^r\log{(x)}}{(r^2-2\,r+1)x} + \frac{berx^r\log{(c)}}{(r^2-2\,r+1)x} \\ & - \frac{bdn\log{(x)}}{x} - \frac{benx^r\log{(x)}}{(r^2-2\,r+1)x} - \frac{bdn}{x} \\ & - \frac{benx^r}{(r^2-2\,r+1)x} + \frac{aerx^r}{(r^2-2\,r+1)x} - \frac{bd\log{(c)}}{x} \\ & - \frac{bex^r\log{(c)}}{(r^2-2\,r+1)x} - \frac{ad}{x} - \frac{aex^r}{(r^2-2\,r+1)x}\end{aligned}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
b*e*n*r*x^r*log(x)/((r^2 - 2*r + 1)*x) + b*e*r*x^r*log(c)/((r^2 - 2*r + 1)
*x) - b*d*n*log(x)/x - b*e*n*x^r*log(x)/((r^2 - 2*r + 1)*x) - b*d*n/x - b*
e*n*x^r/((r^2 - 2*r + 1)*x) + a*e*r*x^r/((r^2 - 2*r + 1)*x) - b*d*log(c)/x
 - b*e*x^r*log(c)/((r^2 - 2*r + 1)*x) - a*d/x - a*e*x^r/((r^2 - 2*r + 1)*x
)
```

3.376.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^2}\,dx = \int \frac{(d+e\,x^r)\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^2}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^2,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^2, x)
```

3.377 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx$

3.377.1 Optimal result

Integrand size = 21, antiderivative size = 71

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx=-\frac{bdn}{9x^3}-\frac{benx^{-3+r}}{(3-r)^2}-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{ex^{-3+r}(a+b\log(cx^n))}{3-r}$$

output
```
-1/9*b*d*n/x^3-b*e*n*x^(-3+r)/(3-r)^2-1/3*d*(a+b*ln(c*x^n))/x^3-e*x^(-3+r)
*(a+b*ln(c*x^n))/(3-r)
```

3.377.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx=-\frac{3a(-3+r)(d(-3+r)-3ex^r)+bn(d(-3+r)^2+9ex^r)+3b(-3+r)(d(-3+r)-3ex^r)\log(cx^n)}{9(-3+r)^2x^3}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-1/9*(3*a*(-3 + r)*(d*(-3 + r) - 3*e*x^r) + b*n*(d*(-3 + r)^2 + 9*e*x^r) +
 3*b*(-3 + r)*(d*(-3 + r) - 3*e*x^r)*Log[c*x^n])/((-3 + r)^2*x^3)
```

3.377.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(-\frac{ex^{r-4}}{3-r}-\frac{d}{3x^4}\right)dx-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{ex^{r-3}(a+b\log(cx^n))}{3-r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{3x^3}-\frac{ex^{r-3}(a+b\log(cx^n))}{3-r}-bn\left(\frac{d}{9x^3}+\frac{ex^{r-3}}{(3-r)^2}\right)$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
-(b*n*(d/(9*x^3) + (e*x^(-3 + r))/(3 - r)^2)) - (d*(a + b*Log[c*x^n]))/(3*
x^3) - (e*x^(-3 + r)*(a + b*Log[c*x^n]))/(3 - r)
```

3.377.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.377.4 Maple [A] (verified)

Time = 0.22 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.90

method	result
parallelrisch	$-\frac{-9x^r \ln(c\,x^n)ber+3\ln(c\,x^n)bd\,r^2+bdn\,r^2+27x^r \ln(c\,x^n)be-9x^r aer+9x^r ben-18\ln(c\,x^n)bdr+3ad\,r^2-6bdnr+27x^r ae+27b}{9x^3(r^2-6r+9)}$
risch	$-\frac{b(dr-3e\,x^r-3d)\ln(x^n)}{3(-3+r)x^3}-\frac{54x^r ae+18bdn+54ad-18x^r aer+18x^r ben+27i\pi bd\ \mathrm{csgn}(ix^n)\ \mathrm{csgn}(ic\,x^n)^2+3i\pi bd\,r^2\ \mathrm{csgn}(ic)\ \mathrm{cs}}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/9*(-9*x^r*ln(c*x^n)*b*e*r+3*ln(c*x^n)*b*d*r^2+b*d*n*r^2+27*x^r*ln(c*x^n
)*b*e-9*x^r*a*e*r+9*x^r*b*e*n-18*ln(c*x^n)*b*d*r+3*a*d*r^2-6*b*d*n*r+27*x^
r*a*e+27*b*ln(c*x^n)*d-18*a*d*r+9*b*d*n+27*a*d)/x^3/(r^2-6*r+9)
```

3.377.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 140 vs. 2(62) = 124.

Time = 0.29 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x^4}\,dx =$$
$$-\frac{9\,bdn+(bdn+3\,ad)r^2+27\,ad-6\,(bdn+3\,ad)r+9\,(ben-aer+3\,ae-(ber-3\,be)\log{(c)}-(benr-}{9\,(r^2-6\,r+9)x^3}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/9*(9*b*d*n + (b*d*n + 3*a*d)*r^2 + 27*a*d - 6*(b*d*n + 3*a*d)*r + 9*(b*
e*n - a*e*r + 3*a*e - (b*e*r - 3*b*e)*log(c) - (b*e*n*r - 3*b*e*n)*log(x))
*x^r + 3*(b*d*r^2 - 6*b*d*r + 9*b*d)*log(c) + 3*(b*d*n*r^2 - 6*b*d*n*r + 9
*b*d*n)*log(x))/((r^2 - 6*r + 9)*x^3)
```

3.377.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 495 vs. 2(63) = 126.

Time = 2.57 (sec) , antiderivative size = 495, normalized size of antiderivative = 6.97

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx$$
$$= \begin{cases} -\frac{3adr^2}{9r^2x^3-54rx^3+81x^3} + \frac{18adr}{9r^2x^3-54rx^3+81x^3} - \frac{27ad}{9r^2x^3-54rx^3+81x^3} + \frac{9aerx^r}{9r^2x^3-54rx^3+81x^3} - \frac{27aex^r}{9r^2x^3-54rx^3+81x^3} - \frac{bdnr^2}{9r^2x^3-54rx^3} \\ -\frac{ad}{3x^3} + ae\log(x) + bd\left(-\frac{n}{9x^3} - \frac{\log(cx^n)}{3x^3}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**4,x)
```

output
```
Piecewise((-3*a*d*r**2/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) + 18*a*d*r/(9*r
**2*x**3 - 54*r*x**3 + 81*x**3) - 27*a*d/(9*r**2*x**3 - 54*r*x**3 + 81*x**
3) + 9*a*e*r*x**r/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) - 27*a*e*x**r/(9*r**
2*x**3 - 54*r*x**3 + 81*x**3) - b*d*n*r**2/(9*r**2*x**3 - 54*r*x**3 + 81*x
**3) + 6*b*d*n*r/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) - 9*b*d*n/(9*r**2*x**
3 - 54*r*x**3 + 81*x**3) - 3*b*d*r**2*log(c*x**n)/(9*r**2*x**3 - 54*r*x**3
 + 81*x**3) + 18*b*d*r*log(c*x**n)/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) - 2
7*b*d*log(c*x**n)/(9*r**2*x**3 - 54*r*x**3 + 81*x**3) - 9*b*e*n*x**r/(9*r*
*2*x**3 - 54*r*x**3 + 81*x**3) + 9*b*e*r*x**r*log(c*x**n)/(9*r**2*x**3 - 5
4*r*x**3 + 81*x**3) - 27*b*e*x**r*log(c*x**n)/(9*r**2*x**3 - 54*r*x**3 + 8
1*x**3), Ne(r, 3)), (-a*d/(3*x**3) + a*e*log(x) + b*d*(-n/(9*x**3) - log(c
*x**n)/(3*x**3)) - b*e*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)
**2/(2*n), True)), True))
```

3.377.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-4>0)', see `assume?` for more
details)Is
```

3.377.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 390 vs. $2(62) = 124$.

Time = 0.35 (sec) , antiderivative size = 390, normalized size of antiderivative = 5.49

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx = -\frac{bdnr^2\log(x)}{3(r^2-6r+9)x^3} + \frac{benrx^r\log(x)}{(r^2-6r+9)x^3} - \frac{bdnr^2}{9(r^2-6r+9)x^3} - \frac{bdr^2\log(c)}{3(r^2-6r+9)x^3} + \frac{berx^r\log(c)}{(r^2-6r+9)x^3} + \frac{2\,bdnr\log(x)}{(r^2-6r+9)x^3} - \frac{3\,benx^r\log(x)}{(r^2-6r+9)x^3} + \frac{2\,bdnr}{3(r^2-6r+9)x^3} - \frac{adr^2}{3(r^2-6r+9)x^3} - \frac{benx^r}{(r^2-6r+9)x^3} + \frac{aerx^r}{(r^2-6r+9)x^3} + \frac{2\,bdr\log(c)}{(r^2-6r+9)x^3} - \frac{3\,bex^r\log(c)}{(r^2-6r+9)x^3} - \frac{3\,bdn\log(x)}{(r^2-6r+9)x^3} - \frac{bdn}{(r^2-6r+9)x^3} + \frac{2\,adr}{(r^2-6r+9)x^3} - \frac{3\,aex^r}{(r^2-6r+9)x^3} - \frac{3\,bd\log(c)}{(r^2-6r+9)x^3} - \frac{3\,ad}{(r^2-6r+9)x^3}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
-1/3*b*d*n*r^2*log(x)/((r^2 - 6*r + 9)*x^3) + b*e*n*r*x^r*log(x)/((r^2 - 6
*r + 9)*x^3) - 1/9*b*d*n*r^2/((r^2 - 6*r + 9)*x^3) - 1/3*b*d*r^2*log(c)/((
r^2 - 6*r + 9)*x^3) + b*e*r*x^r*log(c)/((r^2 - 6*r + 9)*x^3) + 2*b*d*n*r*l
og(x)/((r^2 - 6*r + 9)*x^3) - 3*b*e*n*x^r*log(x)/((r^2 - 6*r + 9)*x^3) + 2
/3*b*d*n*r/((r^2 - 6*r + 9)*x^3) - 1/3*a*d*r^2/((r^2 - 6*r + 9)*x^3) - b*e
*n*x^r/((r^2 - 6*r + 9)*x^3) + a*e*r*x^r/((r^2 - 6*r + 9)*x^3) + 2*b*d*r*l
og(c)/((r^2 - 6*r + 9)*x^3) - 3*b*e*x^r*log(c)/((r^2 - 6*r + 9)*x^3) - 3*b
*d*n*log(x)/((r^2 - 6*r + 9)*x^3) - b*d*n/((r^2 - 6*r + 9)*x^3) + 2*a*d*r/
((r^2 - 6*r + 9)*x^3) - 3*a*e*x^r/((r^2 - 6*r + 9)*x^3) - 3*b*d*log(c)/((r
^2 - 6*r + 9)*x^3) - 3*a*d/((r^2 - 6*r + 9)*x^3)
```

3.377.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^4}\,dx = \int \frac{(d+e\,x^r)\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x^4}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^4,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^4, x)
```

3.378 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx$

3.378.1 Optimal result

Integrand size = 21, antiderivative size = 71

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx = -\frac{bdn}{25x^5}-\frac{benx^{-5+r}}{(5-r)^2}-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{ex^{-5+r}(a+b\log(cx^n))}{5-r}$$

output
```
-1/25*b*d*n/x^5-b*e*n*x^(-5+r)/(5-r)^2-1/5*d*(a+b*ln(c*x^n))/x^5-e*x^(-5+r
)*(a+b*ln(c*x^n))/(5-r)
```

3.378.2 Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 72, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx = -\frac{5a(-5+r)(d(-5+r)-5ex^r)+bn(d(-5+r)^2+25ex^r)+5b(-5+r)(d(-5+r)-5ex^r)\log(cx^n)}{25(-5+r)^2x^5}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-1/25*(5*a*(-5 + r)*(d*(-5 + r) - 5*e*x^r) + b*n*(d*(-5 + r)^2 + 25*e*x^r)
 + 5*b*(-5 + r)*(d*(-5 + r) - 5*e*x^r)*Log[c*x^n])/((-5 + r)^2*x^5)
```

3.378.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2772, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \left(-\frac{ex^{r-6}}{5-r}-\frac{d}{5x^6}\right)dx-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{ex^{r-5}(a+b\log(cx^n))}{5-r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d(a+b\log(cx^n))}{5x^5}-\frac{ex^{r-5}(a+b\log(cx^n))}{5-r}-bn\left(\frac{d}{25x^5}+\frac{ex^{r-5}}{(5-r)^2}\right)$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
-(b*n*(d/(25*x^5) + (e*x^(-5 + r))/(5 - r)^2)) - (d*(a + b*Log[c*x^n]))/(5
*x^5) - (e*x^(-5 + r)*(a + b*Log[c*x^n]))/(5 - r)
```

3.378.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.378.4 Maple [A] (verified)

Time = 0.75 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.90

method	result
parallelrisch	$-\frac{-25x^r \ln(c\,x^n)ber+5\ln(c\,x^n)bd\,r^2+bdn\,r^2+125x^r \ln(c\,x^n)be-25x^r aer+25x^r ben-50\ln(c\,x^n)bdr+5ad\,r^2-10bdnr+125x^r a}{25x^5(r^2-10r+25)}$
risch	$-\frac{b(dr-5e\,x^r-5d)\ln(x^n)}{5(-5+r)x^5}-\frac{250x^r ae+50bdn+250ad-50x^r aer+50x^r ben+125i\pi bd\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2+5i\pi bd\,r^2\,\mathrm{csgn}(ic}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/25*(-25*x^r*ln(c*x^n)*b*e*r+5*ln(c*x^n)*b*d*r^2+b*d*n*r^2+125*x^r*ln(c*
x^n)*b*e-25*x^r*a*e*r+25*x^r*b*e*n-50*ln(c*x^n)*b*d*r+5*a*d*r^2-10*b*d*n*r
+125*x^r*a*e+125*b*ln(c*x^n)*d-50*a*d*r+25*b*d*n+125*a*d)/x^5/(r^2-10*r+25
)
```

3.378.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 140 vs. 2(62) = 124.

Time = 0.29 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x^6}\,dx =$$
$$-\frac{25\,bdn+(bdn+5\,ad)r^2+125\,ad-10\,(bdn+5\,ad)r+25\,(ben-aer+5\,ae-(ber-5\,be)\log{(c)}-(be}{25\,(r^2-10\,r+}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/25*(25*b*d*n + (b*d*n + 5*a*d)*r^2 + 125*a*d - 10*(b*d*n + 5*a*d)*r + 2
5*(b*e*n - a*e*r + 5*a*e - (b*e*r - 5*b*e)*log(c) - (b*e*n*r - 5*b*e*n)*lo
g(x))*x^r + 5*(b*d*r^2 - 10*b*d*r + 25*b*d)*log(c) + 5*(b*d*n*r^2 - 10*b*d
*n*r + 25*b*d*n)*log(x))/((r^2 - 10*r + 25)*x^5)
```

3.378.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 495 vs. $2(63) = 126$.

Time = 5.03 (sec) , antiderivative size = 495, normalized size of antiderivative = 6.97

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx = \begin{cases} -\frac{5adr^2}{25r^2x^5-250rx^5+625x^5} + \frac{50adr}{25r^2x^5-250rx^5+625x^5} - \frac{125ad}{25r^2x^5-250rx^5+625x^5} + \frac{25aerx^r}{25r^2x^5-250rx^5+625x^5} - \frac{125aex^r}{25r^2x^5-250rx^5+625x^5} \\ -\frac{ad}{5x^5} + ae\log(x) + bd\left(-\frac{n}{25x^5} - \frac{\log(cx^n)}{5x^5}\right) - be\left(\begin{cases} -\log(c)\log(x) & \text{for } n=0 \\ -\frac{\log(cx^n)^2}{2n} & \text{otherwise} \end{cases}\right) \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x**6,x)
```

output
```
Piecewise((-5*a*d*r**2/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) + 50*a*d*r/(
25*r**2*x**5 - 250*r*x**5 + 625*x**5) - 125*a*d/(25*r**2*x**5 - 250*r*x**5
 + 625*x**5) + 25*a*e*r*x**r/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) - 125*
a*e*x**r/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) - b*d*n*r**2/(25*r**2*x**5
 - 250*r*x**5 + 625*x**5) + 10*b*d*n*r/(25*r**2*x**5 - 250*r*x**5 + 625*x*
*5) - 25*b*d*n/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) - 5*b*d*r**2*log(c*x
**n)/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) + 50*b*d*r*log(c*x**n)/(25*r**
2*x**5 - 250*r*x**5 + 625*x**5) - 125*b*d*log(c*x**n)/(25*r**2*x**5 - 250*
r*x**5 + 625*x**5) - 25*b*e*n*x**r/(25*r**2*x**5 - 250*r*x**5 + 625*x**5)
+ 25*b*e*r*x**r*log(c*x**n)/(25*r**2*x**5 - 250*r*x**5 + 625*x**5) - 125*b
*e*x**r*log(c*x**n)/(25*r**2*x**5 - 250*r*x**5 + 625*x**5), Ne(r, 5)), (-a
*d/(5*x**5) + a*e*log(x) + b*d*(-n/(25*x**5) - log(c*x**n)/(5*x**5)) - b*e
*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)), Tru
e))
```

3.378.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-6>0)', see `assume?` for more
details)Is
```

3.378.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 390 vs. $2(62) = 124$.

Time = 0.35 (sec) , antiderivative size = 390, normalized size of antiderivative = 5.49

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x^6}\,dx = -\frac{bdnr^2\log(x)}{5(r^2-10r+25)x^5} + \frac{benrx^r\log(x)}{(r^2-10r+25)x^5} - \frac{bdnr^2}{25(r^2-10r+25)x^5} - \frac{bdr^2\log(c)}{5(r^2-10r+25)x^5} + \frac{berx^r\log(c)}{(r^2-10r+25)x^5} + \frac{2bdnr\log(x)}{(r^2-10r+25)x^5} - \frac{5benx^r\log(x)}{(r^2-10r+25)x^5} + \frac{2bdnr}{5(r^2-10r+25)x^5} - \frac{adr^2}{5(r^2-10r+25)x^5} - \frac{benx^r}{(r^2-10r+25)x^5} + \frac{aerx^r}{(r^2-10r+25)x^5} + \frac{2bdr\log(c)}{(r^2-10r+25)x^5} - \frac{5bex^r\log(c)}{(r^2-10r+25)x^5} - \frac{5bdn\log(x)}{(r^2-10r+25)x^5} - \frac{bdn}{(r^2-10r+25)x^5} + \frac{2adr}{(r^2-10r+25)x^5} - \frac{5aex^r}{(r^2-10r+25)x^5} - \frac{5bd\log(c)}{(r^2-10r+25)x^5} - \frac{5ad}{(r^2-10r+25)x^5}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
-1/5*b*d*n*r^2*log(x)/((r^2 - 10*r + 25)*x^5) + b*e*n*r*x^r*log(x)/((r^2 -
 10*r + 25)*x^5) - 1/25*b*d*n*r^2/((r^2 - 10*r + 25)*x^5) - 1/5*b*d*r^2*lo
g(c)/((r^2 - 10*r + 25)*x^5) + b*e*r*x^r*log(c)/((r^2 - 10*r + 25)*x^5) +
2*b*d*n*r*log(x)/((r^2 - 10*r + 25)*x^5) - 5*b*e*n*x^r*log(x)/((r^2 - 10*r
 + 25)*x^5) + 2/5*b*d*n*r/((r^2 - 10*r + 25)*x^5) - 1/5*a*d*r^2/((r^2 - 10
*r + 25)*x^5) - b*e*n*x^r/((r^2 - 10*r + 25)*x^5) + a*e*r*x^r/((r^2 - 10*r
 + 25)*x^5) + 2*b*d*r*log(c)/((r^2 - 10*r + 25)*x^5) - 5*b*e*x^r*log(c)/((
r^2 - 10*r + 25)*x^5) - 5*b*d*n*log(x)/((r^2 - 10*r + 25)*x^5) - b*d*n/((r
^2 - 10*r + 25)*x^5) + 2*a*d*r/((r^2 - 10*r + 25)*x^5) - 5*a*e*x^r/((r^2 -
 10*r + 25)*x^5) - 5*b*d*log(c)/((r^2 - 10*r + 25)*x^5) - 5*a*d/((r^2 - 10
*r + 25)*x^5)
```

3.378.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x^6}\,dx=\int \frac{\left(d+e\,x^r\right)\,\left(a+b\,\ln{\left(c\,x^n\right)}\right)}{x^6}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^6,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x^6, x)
```

3.379 $\int x^5(d+ex^r)^2(a+b\log(cx^n))\,dx$

3.379.1 Optimal result

Integrand size = 23, antiderivative size = 103

$$\int x^5(d+ex^r)^2(a+b\log(cx^n))\,dx = -\frac{1}{36}bd^2nx^6-\frac{be^2nx^{2(3+r)}}{4(3+r)^2}-\frac{2bdenx^{6+r}}{(6+r)^2}+\frac{1}{6}\left(d^2x^6+\frac{3e^2x^{2(3+r)}}{3+r}+\frac{12dex^{6+r}}{6+r}\right)(a+b\log(cx^n))$$

output
```
-1/36*b*d^2*n*x^6-1/4*b*e^2*n*x^(6+2*r)/(3+r)^2-2*b*d*e*n*x^(6+r)/(6+r)^2+
1/6*(d^2*x^6+3*e^2*x^(6+2*r)/(3+r)+12*d*e*x^(6+r)/(6+r))*(a+b*ln(c*x^n))
```

3.379.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.15

$$\int x^5(d+ex^r)^2(a+b\log(cx^n))\,dx = \frac{1}{36}x^6\left(bn\left(-d^2-\frac{72dex^r}{(6+r)^2}-\frac{9e^2x^{2r}}{(3+r)^2}\right)+6a\left(d^2+\frac{12dex^r}{6+r}+\frac{3e^2x^{2r}}{3+r}\right)+6b\left(d^2+\frac{12dex^r}{6+r}+\frac{3e^2x^{2r}}{3+r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^5*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^6*(b*n*(-d^2 - (72*d*e*x^r)/(6 + r)^2 - (9*e^2*x^(2*r))/(3 + r)^2) + 6*
a*(d^2 + (12*d*e*x^r)/(6 + r) + (3*e^2*x^(2*r))/(3 + r)) + 6*b*(d^2 + (12*
d*e*x^r)/(6 + r) + (3*e^2*x^(2*r))/(3 + r))*Log[c*x^n]))/36
```

3.379.3 Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2771, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5 (d+ex^r)^2 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{6}\left(d^2x^6+\frac{12dex^{r+6}}{r+6}+\frac{3e^2x^{2(r+3)}}{r+3}\right)(a+b\log(cx^n))-bn\int \frac{1}{6}x^5\left(\frac{12dex^r}{r+6}+\frac{3e^2x^{2r}}{r+3}+d^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{6}\left(d^2x^6+\frac{12dex^{r+6}}{r+6}+\frac{3e^2x^{2(r+3)}}{r+3}\right)(a+b\log(cx^n))-\frac{1}{6}bn\int x^5\left(\frac{12dex^r}{r+6}+\frac{3e^2x^{2r}}{r+3}+d^2\right)dx$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{6}\left(d^2x^6+\frac{12dex^{r+6}}{r+6}+\frac{3e^2x^{2(r+3)}}{r+3}\right)(a+b\log(cx^n))-\frac{1}{6}bn\int \left(\frac{12dex^{r+5}}{r+6}+\frac{3e^2x^{2r+5}}{r+3}+d^2x^5\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{6}\left(d^2x^6+\frac{12dex^{r+6}}{r+6}+\frac{3e^2x^{2(r+3)}}{r+3}\right)(a+b\log(cx^n))-\frac{1}{6}bn\left(\frac{d^2x^6}{6}+\frac{12dex^{r+6}}{(r+6)^2}+\frac{3e^2x^{2(r+3)}}{2(r+3)^2}\right)$$

input
```
Int[x^5*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/6*(b*n*((d^2*x^6)/6 + (3*e^2*x^(2*(3 + r)))/(2*(3 + r)^2) + (12*d*e*x^(
6 + r))/(6 + r)^2)) + ((d^2*x^6 + (3*e^2*x^(2*(3 + r)))/(3 + r) + (12*d*e*
x^(6 + r))/(6 + r))*(a + b*Log[c*x^n]))/6
```

3.379.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.379.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 582 vs. 2(97) = 194.

Time = 15.65 (sec) , antiderivative size = 583, normalized size of antiderivative = 5.66

method	result
parallelrisch	$-\frac{-1944a\,d^{2}x^{6}-18x^{6}x^{2r}\ln(c\,x^{n})b\,e^{2}r^{3}-270x^{6}x^{2r}\ln(c\,x^{n})b\,e^{2}r^{2}-1296x^{6}x^{2r}\ln(c\,x^{n})b\,e^{2}r+18x^{6}b\,d^{2}n\,r^{3}+117x^{6}b\,d^{2}n\,r^{2}+32}{}$
risch	Expression too large to display

input
```
int(x^5*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/36*(-1944*a*d^2*x^6-1944*e^2*b*ln(c*x^n)*(x^r)^2*x^6+18*x^6*b*d^2*n*r^3
+117*x^6*b*d^2*n*r^2+324*x^6*b*d^2*n*r-72*x^6*x^r*a*d*e*r^3-864*x^6*x^r*a*
d*e*r^2-3240*x^6*x^r*a*d*e*r+648*x^6*x^r*b*d*e*n-3888*b*d*e*ln(c*x^n)*x^r*
x^6+9*x^6*(x^r)^2*b*e^2*n*r^2+108*x^6*(x^r)^2*b*e^2*n*r-18*x^6*(x^r)^2*ln(
c*x^n)*b*e^2*r^3-270*x^6*(x^r)^2*ln(c*x^n)*b*e^2*r^2-1296*x^6*(x^r)^2*ln(c
*x^n)*b*e^2*r-1944*x^6*(x^r)^2*a*e^2-6*x^6*a*d^2*r^4-108*x^6*a*d^2*r^3-702
*x^6*a*d^2*r^2-1944*x^6*a*d^2*r+72*x^6*x^r*b*d*e*n*r^2-1296*x^6*(x^r)^2*a*
e^2*r+324*x^6*(x^r)^2*b*e^2*n-6*x^6*ln(c*x^n)*b*d^2*r^4-108*x^6*ln(c*x^n)*
b*d^2*r^3-702*x^6*ln(c*x^n)*b*d^2*r^2-1944*x^6*ln(c*x^n)*b*d^2*r-3888*x^6*
x^r*a*d*e+x^6*b*d^2*n*r^4-18*x^6*(x^r)^2*a*e^2*r^3-270*x^6*(x^r)^2*a*e^2*r
^2-72*x^6*x^r*ln(c*x^n)*b*d*e*r^3-864*x^6*x^r*ln(c*x^n)*b*d*e*r^2-3240*x^6
*x^r*ln(c*x^n)*b*d*e*r+432*x^6*x^r*b*d*e*n*r+324*b*d^2*n*x^6-1944*x^6*ln(c
*x^n)*b*d^2)/(r^2+6*r+9)/(6+r)^2
```

3.379.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 489 vs. $2(97) = 194$.

Time = 0.30 (sec) , antiderivative size = 489, normalized size of antiderivative = 4.75

$$\int x^5(d+ex^r)^2(a+b\log(cx^n))\,dx = \frac{6\left(bd^2r^4+18\,bd^2r^3+117\,bd^2r^2+324\,bd^2r+324\,bd^2\right)x^6\log(c)+6\left(bd^2nr^4+18\,bd^2nr^3+117\,bd^2nr^2+32\right.}{}$$

input
```
integrate(x^5*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/36*(6*(b*d^2*r^4 + 18*b*d^2*r^3 + 117*b*d^2*r^2 + 324*b*d^2*r + 324*b*d^
2)*x^6*log(c) + 6*(b*d^2*n*r^4 + 18*b*d^2*n*r^3 + 117*b*d^2*n*r^2 + 324*b*
d^2*n*r + 324*b*d^2*n)*x^6*log(x) - ((b*d^2*n - 6*a*d^2)*r^4 + 324*b*d^2*n
 + 18*(b*d^2*n - 6*a*d^2)*r^3 - 1944*a*d^2 + 117*(b*d^2*n - 6*a*d^2)*r^2 +
 324*(b*d^2*n - 6*a*d^2)*r)*x^6 + 9*(2*(b*e^2*r^3 + 15*b*e^2*r^2 + 72*b*e^
2*r + 108*b*e^2)*x^6*log(c) + 2*(b*e^2*n*r^3 + 15*b*e^2*n*r^2 + 72*b*e^2*n
*r + 108*b*e^2*n)*x^6*log(x) + (2*a*e^2*r^3 - 36*b*e^2*n + 216*a*e^2 - (b*
e^2*n - 30*a*e^2)*r^2 - 12*(b*e^2*n - 12*a*e^2)*r)*x^6)*x^(2*r) + 72*((b*d
*e*r^3 + 12*b*d*e*r^2 + 45*b*d*e*r + 54*b*d*e)*x^6*log(c) + (b*d*e*n*r^3 +
 12*b*d*e*n*r^2 + 45*b*d*e*n*r + 54*b*d*e*n)*x^6*log(x) + (a*d*e*r^3 - 9*b
*d*e*n + 54*a*d*e - (b*d*e*n - 12*a*d*e)*r^2 - 3*(2*b*d*e*n - 15*a*d*e)*r)
*x^6)*x^r)/(r^4 + 18*r^3 + 117*r^2 + 324*r + 324)
```

3.379.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1634 vs. 2(97) = 194.

Time = 26.36 (sec) , antiderivative size = 1634, normalized size of antiderivative = 15.86

$$\int x^5(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\text{Too large to display}$$

input
```
integrate(x**5*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d**2*x**6/6 + 2*a*d*e*log(c*x**n)/n - a*e**2/(6*x**6) - b*d**
2*n*x**6/36 + b*d**2*x**6*log(c*x**n)/6 + b*d*e*log(c*x**n)**2/n - b*e**2*
n/(36*x**6) - b*e**2*log(c*x**n)/(6*x**6), Eq(r, -6)), (a*d**2*x**6/6 + 2*
a*d*e*x**3/3 + a*e**2*log(c*x**n)/n - b*d**2*n*x**6/36 + b*d**2*x**6*log(c
*x**n)/6 - 2*b*d*e*n*x**3/9 + 2*b*d*e*x**3*log(c*x**n)/3 + b*e**2*log(c*x*
*n)**2/(2*n), Eq(r, -3)), (6*a*d**2*r**4*x**6/(36*r**4 + 648*r**3 + 4212*r
**2 + 11664*r + 11664) + 108*a*d**2*r**3*x**6/(36*r**4 + 648*r**3 + 4212*r
**2 + 11664*r + 11664) + 702*a*d**2*r**2*x**6/(36*r**4 + 648*r**3 + 4212*r
**2 + 11664*r + 11664) + 1944*a*d**2*r*x**6/(36*r**4 + 648*r**3 + 4212*r**
2 + 11664*r + 11664) + 1944*a*d**2*x**6/(36*r**4 + 648*r**3 + 4212*r**2 +
11664*r + 11664) + 72*a*d*e*r**3*x**6*x**r/(36*r**4 + 648*r**3 + 4212*r**2
 + 11664*r + 11664) + 864*a*d*e*r**2*x**6*x**r/(36*r**4 + 648*r**3 + 4212*
r**2 + 11664*r + 11664) + 3240*a*d*e*r*x**6*x**r/(36*r**4 + 648*r**3 + 421
2*r**2 + 11664*r + 11664) + 3888*a*d*e*x**6*x**r/(36*r**4 + 648*r**3 + 421
2*r**2 + 11664*r + 11664) + 18*a*e**2*r**3*x**6*x**(2*r)/(36*r**4 + 648*r*
*3 + 4212*r**2 + 11664*r + 11664) + 270*a*e**2*r**2*x**6*x**(2*r)/(36*r**4
 + 648*r**3 + 4212*r**2 + 11664*r + 11664) + 1296*a*e**2*r*x**6*x**(2*r)/(
36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) + 1944*a*e**2*x**6*x**(2
*r)/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) - b*d**2*n*r**4*x**
6/(36*r**4 + 648*r**3 + 4212*r**2 + 11664*r + 11664) - 18*b*d**2*n*r**3...
```

3.379.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.44

$$\begin{aligned}\int x^5(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx=&-\frac{1}{36}\,bd^2nx^6+\frac{1}{6}\,bd^2x^6\log\left(cx^n\right)+\frac{1}{6}\,ad^2x^6\\&+\frac{be^2x^{2\,r+6}\log\left(cx^n\right)}{2\,(r+3)}+\frac{2\,bdex^{r+6}\log\left(cx^n\right)}{r+6}\\&-\frac{be^2nx^{2\,r+6}}{4\,(r+3)^2}+\frac{ae^2x^{2\,r+6}}{2\,(r+3)}-\frac{2\,bdenx^{r+6}}{(r+6)^2}+\frac{2\,adex^{r+6}}{r+6}\end{aligned}$$

input
```
integrate(x^5*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*d^2*n*x^6 + 1/6*b*d^2*x^6*log(c*x^n) + 1/6*a*d^2*x^6 + 1/2*b*e^2*x
^(2*r + 6)*log(c*x^n)/(r + 3) + 2*b*d*e*x^(r + 6)*log(c*x^n)/(r + 6) - 1/4
*b*e^2*n*x^(2*r + 6)/(r + 3)^2 + 1/2*a*e^2*x^(2*r + 6)/(r + 3) - 2*b*d*e*n
*x^(r + 6)/(r + 6)^2 + 2*a*d*e*x^(r + 6)/(r + 6)
```

3.379.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 744 vs. $2(97) = 194$.

Time = 0.37 (sec) , antiderivative size = 744, normalized size of antiderivative = 7.22

$$\int x^5(d+ex^r)^2(a+b\log(cx^n))\,dx$$
$$= \frac{18\,be^2nr^3x^6x^{2\,r}\log(x) + 72\,bdenr^3x^6x^r\log(x) + 6\,bd^2nr^4x^6\log(x) - bd^2nr^4x^6 + 18\,be^2r^3x^6x^{2\,r}\log(c) + \cdots}{}$$

input
```
integrate(x^5*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/36*(18*b*e^2*n*r^3*x^6*x^(2*r)*log(x) + 72*b*d*e*n*r^3*x^6*x^r*log(x) +
6*b*d^2*n*r^4*x^6*log(x) - b*d^2*n*r^4*x^6 + 18*b*e^2*r^3*x^6*x^(2*r)*log(
c) + 72*b*d*e*r^3*x^6*x^r*log(c) + 6*b*d^2*r^4*x^6*log(c) + 270*b*e^2*n*r^
2*x^6*x^(2*r)*log(x) + 864*b*d*e*n*r^2*x^6*x^r*log(x) + 108*b*d^2*n*r^3*x^
6*log(x) - 9*b*e^2*n*r^2*x^6*x^(2*r) + 18*a*e^2*r^3*x^6*x^(2*r) - 72*b*d*e
*n*r^2*x^6*x^r + 72*a*d*e*r^3*x^6*x^r - 18*b*d^2*n*r^3*x^6 + 6*a*d^2*r^4*x
^6 + 270*b*e^2*r^2*x^6*x^(2*r)*log(c) + 864*b*d*e*r^2*x^6*x^r*log(c) + 108
*b*d^2*r^3*x^6*log(c) + 1296*b*e^2*n*r*x^6*x^(2*r)*log(x) + 3240*b*d*e*n*r
*x^6*x^r*log(x) + 702*b*d^2*n*r^2*x^6*log(x) - 108*b*e^2*n*r*x^6*x^(2*r) +
 270*a*e^2*r^2*x^6*x^(2*r) - 432*b*d*e*n*r*x^6*x^r + 864*a*d*e*r^2*x^6*x^r
 - 117*b*d^2*n*r^2*x^6 + 108*a*d^2*r^3*x^6 + 1296*b*e^2*r*x^6*x^(2*r)*log(
c) + 3240*b*d*e*r*x^6*x^r*log(c) + 702*b*d^2*r^2*x^6*log(c) + 1944*b*e^2*n
*x^6*x^(2*r)*log(x) + 3888*b*d*e*n*x^6*x^r*log(x) + 1944*b*d^2*n*r*x^6*log
(x) - 324*b*e^2*n*x^6*x^(2*r) + 1296*a*e^2*r*x^6*x^(2*r) - 648*b*d*e*n*x^6
*x^r + 3240*a*d*e*r*x^6*x^r - 324*b*d^2*n*r*x^6 + 702*a*d^2*r^2*x^6 + 1944
*b*e^2*x^6*x^(2*r)*log(c) + 3888*b*d*e*x^6*x^r*log(c) + 1944*b*d^2*r*x^6*l
og(c) + 1944*b*d^2*n*x^6*log(x) + 1944*a*e^2*x^6*x^(2*r) + 3888*a*d*e*x^6*
x^r - 324*b*d^2*n*x^6 + 1944*a*d^2*r*x^6 + 1944*b*d^2*x^6*log(c) + 1944*a*
d^2*x^6)/(r^4 + 18*r^3 + 117*r^2 + 324*r + 324)
```

3.379.9 Mupad [F(-1)]

Timed out.

$$\int x^5(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^5\,\left(d+e\,x^r\right)^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^5*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int(x^5*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.380 $\int x^3(d+ex^r)^2 (a+b\log(cx^n))\,dx$

3.380.1 Optimal result

Integrand size = 23, antiderivative size = 103

$$\int x^3(d+ex^r)^2 (a+b\log(cx^n))\,dx = -\frac{1}{16}bd^2nx^4 - \frac{be^2nx^{2(2+r)}}{4(2+r)^2} - \frac{2bdenx^{4+r}}{(4+r)^2} + \frac{1}{4}\left(d^2x^4 + \frac{2e^2x^{2(2+r)}}{2+r} + \frac{8dex^{4+r}}{4+r}\right)(a+b\log(cx^n))$$

output
```
-1/16*b*d^2*n*x^4-1/4*b*e^2*n*x^(4+2*r)/(2+r)^2-2*b*d*e*n*x^(4+r)/(4+r)^2+
1/4*(d^2*x^4+2*e^2*x^(4+2*r)/(2+r)+8*d*e*x^(4+r)/(4+r))*(a+b*ln(c*x^n))
```

3.380.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.15

$$\int x^3(d+ex^r)^2 (a+b\log(cx^n))\,dx = \frac{1}{16}x^4\left(bn\left(-d^2 - \frac{32dex^r}{(4+r)^2} - \frac{4e^2x^{2r}}{(2+r)^2}\right) + 4a\left(d^2 + \frac{8dex^r}{4+r} + \frac{2e^2x^{2r}}{2+r}\right) + 4b\left(d^2 + \frac{8dex^r}{4+r} + \frac{2e^2x^{2r}}{2+r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^3*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(b*n*(-d^2 - (32*d*e*x^r)/(4 + r)^2 - (4*e^2*x^(2*r))/(2 + r)^2) + 4*
a*(d^2 + (8*d*e*x^r)/(4 + r) + (2*e^2*x^(2*r))/(2 + r)) + 4*b*(d^2 + (8*d*
e*x^r)/(4 + r) + (2*e^2*x^(2*r))/(2 + r))*Log[c*x^n]))/16
```

3.380.3 Rubi [A] (verified)

Time = 0.37 (sec) , antiderivative size = 101, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2771, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{4}\left(d^2x^4+\frac{8dex^{r+4}}{r+4}+\frac{2e^2x^{2(r+2)}}{r+2}\right)\left(a+b\log\left(cx^n\right)\right)-bn\int\frac{1}{4}x^3\left(\frac{8dex^r}{r+4}+\frac{2e^2x^{2r}}{r+2}+d^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\left(d^2x^4+\frac{8dex^{r+4}}{r+4}+\frac{2e^2x^{2(r+2)}}{r+2}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{4}bn\int x^3\left(\frac{8dex^r}{r+4}+\frac{2e^2x^{2r}}{r+2}+d^2\right)dx$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{4}\left(d^2x^4+\frac{8dex^{r+4}}{r+4}+\frac{2e^2x^{2(r+2)}}{r+2}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{4}bn\int\left(\frac{8dex^{r+3}}{r+4}+\frac{2e^2x^{2r+3}}{r+2}+d^2x^3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(d^2x^4+\frac{8dex^{r+4}}{r+4}+\frac{2e^2x^{2(r+2)}}{r+2}\right)\left(a+b\log\left(cx^n\right)\right)-\frac{1}{4}bn\left(\frac{d^2x^4}{4}+\frac{8dex^{r+4}}{(r+4)^2}+\frac{e^2x^{2(r+2)}}{(r+2)^2}\right)$$

input
```
Int[x^3*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/4*(b*n*((d^2*x^4)/4 + (e^2*x^(2*(2 + r)))/(2 + r)^2 + (8*d*e*x^(4 + r))
/(4 + r)^2)) + ((d^2*x^4 + (2*e^2*x^(2*(2 + r)))/(2 + r) + (8*d*e*x^(4 + r
))/(4 + r))*(a + b*Log[c*x^n]))/4
```

3.380.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.380.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 587 vs. $2(97) = 194$.

Time = 5.23 (sec) , antiderivative size = 588, normalized size of antiderivative = 5.71

method	result
parallelrisch	$-\frac{-256a\,d^2x^4-256x^4x^{2r}\ln(c\,x^n)b\,e^2r+4x^4x^{2r}b\,e^2n\,r^2+32x^4x^{2r}b\,e^2nr-8x^4x^{2r}\ln(c\,x^n)b\,e^2r^3-80x^4x^{2r}\ln(c\,x^n)b\,e^2r^2+128}{}$
risch	Expression too large to display

input
```
int(x^3*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/16*(-256*a*d^2*x^4+128*x^4*x^r*b*d*e*n*r-32*x^4*x^r*ln(c*x^n)*b*d*e*r^3
-256*x^4*x^r*ln(c*x^n)*b*d*e*r^2-640*x^4*x^r*ln(c*x^n)*b*d*e*r+32*x^4*x^r*
b*d*e*n*r^2-4*x^4*a*d^2*r^4-48*x^4*a*d^2*r^3-208*x^4*a*d^2*r^2-384*x^4*a*d
^2*r-256*x^4*(x^r)^2*a*e^2-256*x^4*(x^r)^2*ln(c*x^n)*b*e^2*r-32*x^4*x^r*a*
d*e*r^3-256*x^4*x^r*a*d*e*r^2-640*x^4*x^r*a*d*e*r-512*b*d*e*ln(c*x^n)*x^r*
x^4+128*x^4*x^r*b*d*e*n+4*x^4*(x^r)^2*b*e^2*n*r^2+32*x^4*(x^r)^2*b*e^2*n*r
-8*x^4*(x^r)^2*ln(c*x^n)*b*e^2*r^3-80*x^4*(x^r)^2*ln(c*x^n)*b*e^2*r^2-256*
x^4*ln(c*x^n)*b*d^2-208*x^4*ln(c*x^n)*b*d^2*r^2-384*x^4*ln(c*x^n)*b*d^2*r-
512*x^4*x^r*a*d*e-8*x^4*(x^r)^2*a*e^2*r^3-80*x^4*(x^r)^2*a*e^2*r^2-256*x^4
*(x^r)^2*a*e^2*r+64*x^4*(x^r)^2*b*e^2*n-256*e^2*b*ln(c*x^n)*(x^r)^2*x^4+x^
4*b*d^2*n*r^4+12*x^4*b*d^2*n*r^3+52*x^4*b*d^2*n*r^2+96*x^4*b*d^2*n*r-4*x^4
*ln(c*x^n)*b*d^2*r^4-48*x^4*ln(c*x^n)*b*d^2*r^3+64*b*d^2*n*x^4)/(r^2+4*r+4
)/(r^2+8*r+16)
```

3.380.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 488 vs. $2(97) = 194$.

Time = 0.31 (sec) , antiderivative size = 488, normalized size of antiderivative = 4.74

$$\int x^3(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx = \frac{4\left(bd^2r^4+12\,bd^2r^3+52\,bd^2r^2+96\,bd^2r+64\,bd^2\right)x^4\log\left(c\right)+4\left(bd^2nr^4+12\,bd^2nr^3+52\,bd^2nr^2+96\,bd^2n\right.}{}$$

input
```
integrate(x^3*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/16*(4*(b*d^2*r^4 + 12*b*d^2*r^3 + 52*b*d^2*r^2 + 96*b*d^2*r + 64*b*d^2)*
x^4*log(c) + 4*(b*d^2*n*r^4 + 12*b*d^2*n*r^3 + 52*b*d^2*n*r^2 + 96*b*d^2*n
*r + 64*b*d^2*n)*x^4*log(x) - ((b*d^2*n - 4*a*d^2)*r^4 + 64*b*d^2*n + 12*(
b*d^2*n - 4*a*d^2)*r^3 - 256*a*d^2 + 52*(b*d^2*n - 4*a*d^2)*r^2 + 96*(b*d^
2*n - 4*a*d^2)*r)*x^4 + 4*(2*(b*e^2*r^3 + 10*b*e^2*r^2 + 32*b*e^2*r + 32*b
*e^2)*x^4*log(c) + 2*(b*e^2*n*r^3 + 10*b*e^2*n*r^2 + 32*b*e^2*n*r + 32*b*e
^2*n)*x^4*log(x) + (2*a*e^2*r^3 - 16*b*e^2*n + 64*a*e^2 - (b*e^2*n - 20*a*
e^2)*r^2 - 8*(b*e^2*n - 8*a*e^2)*r)*x^4)*x^(2*r) + 32*((b*d*e*r^3 + 8*b*d*
e*r^2 + 20*b*d*e*r + 16*b*d*e)*x^4*log(c) + (b*d*e*n*r^3 + 8*b*d*e*n*r^2 +
 20*b*d*e*n*r + 16*b*d*e*n)*x^4*log(x) + (a*d*e*r^3 - 4*b*d*e*n + 16*a*d*e
 - (b*d*e*n - 8*a*d*e)*r^2 - 4*(b*d*e*n - 5*a*d*e)*r)*x^4)*x^r)/(r^4 + 12*
r^3 + 52*r^2 + 96*r + 64)
```

3.380.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1625 vs. $2(97) = 194$.

Time = 7.10 (sec) , antiderivative size = 1625, normalized size of antiderivative = 15.78

$$\int x^3(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\text{Too large to display}$$

input
```
integrate(x**3*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d**2*x**4/4 + 2*a*d*e*log(c*x**n)/n - a*e**2/(4*x**4) - b*d**
2*n*x**4/16 + b*d**2*x**4*log(c*x**n)/4 + b*d*e*log(c*x**n)**2/n - b*e**2*
n/(16*x**4) - b*e**2*log(c*x**n)/(4*x**4), Eq(r, -4)), (a*d**2*x**4/4 + a*
d*e*x**2 + a*e**2*log(c*x**n)/n - b*d**2*n*x**4/16 + b*d**2*x**4*log(c*x**
n)/4 - b*d*e*n*x**2/2 + b*d*e*x**2*log(c*x**n) + b*e**2*log(c*x**n)**2/(2*
n), Eq(r, -2)), (4*a*d**2*r**4*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*
r + 1024) + 48*a*d**2*r**3*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r +
1024) + 208*a*d**2*r**2*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 102
4) + 384*a*d**2*r*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 2
56*a*d**2*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 32*a*d*e*
r**3*x**4*x**r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 256*a*d*e
*r**2*x**4*x**r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 640*a*d*
e*r*x**4*x**r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 512*a*d*e*
x**4*x**r/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 8*a*e**2*r**3*
x**4*x**(2*r)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 80*a*e**2*
r**2*x**4*x**(2*r)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 256*a
*e**2*r*x**4*x**(2*r)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) + 25
6*a*e**2*x**4*x**(2*r)/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) - b
*d**2*n*r**4*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) - 12*b*d
**2*n*r**3*x**4/(16*r**4 + 192*r**3 + 832*r**2 + 1536*r + 1024) - 52*b*...
```

3.380.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.44

$$\begin{aligned}\int x^3(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx&=-\frac{1}{16}\,bd^2nx^4+\frac{1}{4}\,bd^2x^4\log\left(cx^n\right)+\frac{1}{4}\,ad^2x^4\\&\quad+\frac{be^2x^{2\,r+4}\log\left(cx^n\right)}{2\,(r+2)}+\frac{2\,bdex^{r+4}\log\left(cx^n\right)}{r+4}\\&\quad-\frac{be^2nx^{2\,r+4}}{4\,(r+2)^2}+\frac{ae^2x^{2\,r+4}}{2\,(r+2)}-\frac{2\,bdenx^{r+4}}{(r+4)^2}+\frac{2\,adex^{r+4}}{r+4}\end{aligned}$$

input
```
integrate(x^3*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*d^2*n*x^4 + 1/4*b*d^2*x^4*log(c*x^n) + 1/4*a*d^2*x^4 + 1/2*b*e^2*x
^(2*r + 4)*log(c*x^n)/(r + 2) + 2*b*d*e*x^(r + 4)*log(c*x^n)/(r + 4) - 1/4
*b*e^2*n*x^(2*r + 4)/(r + 2)^2 + 1/2*a*e^2*x^(2*r + 4)/(r + 2) - 2*b*d*e*n
*x^(r + 4)/(r + 4)^2 + 2*a*d*e*x^(r + 4)/(r + 4)
```

3.380.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 744 vs. $2(97) = 194$.

Time = 0.38 (sec) , antiderivative size = 744, normalized size of antiderivative = 7.22

$$\int x^3(d+ex^r)^2\,(a+b\log(cx^n))\;dx$$
$$=\frac{8\,be^2nr^3x^4x^{2\,r}\log(x)+32\,bdenr^3x^4x^r\log(x)+4\,bd^2nr^4x^4\log(x)-bd^2nr^4x^4+8\,be^2r^3x^4x^{2\,r}\log(c)+32}{}$$

input
```
integrate(x^3*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/16*(8*b*e^2*n*r^3*x^4*x^(2*r)*log(x) + 32*b*d*e*n*r^3*x^4*x^r*log(x) + 4
*b*d^2*n*r^4*x^4*log(x) - b*d^2*n*r^4*x^4 + 8*b*e^2*r^3*x^4*x^(2*r)*log(c)
 + 32*b*d*e*r^3*x^4*x^r*log(c) + 4*b*d^2*r^4*x^4*log(c) + 80*b*e^2*n*r^2*x
^4*x^(2*r)*log(x) + 256*b*d*e*n*r^2*x^4*x^r*log(x) + 48*b*d^2*n*r^3*x^4*lo
g(x) - 4*b*e^2*n*r^2*x^4*x^(2*r) + 8*a*e^2*r^3*x^4*x^(2*r) - 32*b*d*e*n*r^
2*x^4*x^r + 32*a*d*e*r^3*x^4*x^r - 12*b*d^2*n*r^3*x^4 + 4*a*d^2*r^4*x^4 +
80*b*e^2*r^2*x^4*x^(2*r)*log(c) + 256*b*d*e*r^2*x^4*x^r*log(c) + 48*b*d^2*
r^3*x^4*log(c) + 256*b*e^2*n*r*x^4*x^(2*r)*log(x) + 640*b*d*e*n*r*x^4*x^r*
log(x) + 208*b*d^2*n*r^2*x^4*log(x) - 32*b*e^2*n*r*x^4*x^(2*r) + 80*a*e^2*
r^2*x^4*x^(2*r) - 128*b*d*e*n*r*x^4*x^r + 256*a*d*e*r^2*x^4*x^r - 52*b*d^2
*n*r^2*x^4 + 48*a*d^2*r^3*x^4 + 256*b*e^2*r*x^4*x^(2*r)*log(c) + 640*b*d*e
*r*x^4*x^r*log(c) + 208*b*d^2*r^2*x^4*log(c) + 256*b*e^2*n*x^4*x^(2*r)*log
(x) + 512*b*d*e*n*x^4*x^r*log(x) + 384*b*d^2*n*r*x^4*log(x) - 64*b*e^2*n*x
^4*x^(2*r) + 256*a*e^2*r*x^4*x^(2*r) - 128*b*d*e*n*x^4*x^r + 640*a*d*e*r*x
^4*x^r - 96*b*d^2*n*r*x^4 + 208*a*d^2*r^2*x^4 + 256*b*e^2*x^4*x^(2*r)*log(
c) + 512*b*d*e*x^4*x^r*log(c) + 384*b*d^2*r*x^4*log(c) + 256*b*d^2*n*x^4*l
og(x) + 256*a*e^2*x^4*x^(2*r) + 512*a*d*e*x^4*x^r - 64*b*d^2*n*x^4 + 384*a
*d^2*r*x^4 + 256*b*d^2*x^4*log(c) + 256*a*d^2*x^4)/(r^4 + 12*r^3 + 52*r^2
+ 96*r + 64)
```

3.380.9 Mupad [F(-1)]

Timed out.

$$\int x^3(d+ex^r)^2(a+b\log(cx^n))\,dx = \int x^3\,(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x^3*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int(x^3*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.381 $\int x(d+ex^r)^2 (a+b\log(cx^n))\,dx$

3.381.1 Optimal result

Integrand size = 21, antiderivative size = 102

$$\int x(d+ex^r)^2 (a+b\log(cx^n))\,dx = -\frac{1}{4}bd^2nx^2 - \frac{be^2nx^{2(1+r)}}{4(1+r)^2} - \frac{2bdenx^{2+r}}{(2+r)^2} + \frac{1}{2}\left(d^2x^2 + \frac{e^2x^{2(1+r)}}{1+r} + \frac{4dex^{2+r}}{2+r}\right)(a+b\log(cx^n))$$

output
```
-1/4*b*d^2*n*x^2-1/4*b*e^2*n*x^(2+2*r)/(1+r)^2-2*b*d*e*n*x^(2+r)/(2+r)^2+1
/2*(d^2*x^2+e^2*x^(2+2*r)/(1+r)+4*d*e*x^(2+r)/(2+r))*(a+b*ln(c*x^n))
```

3.381.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.14

$$\int x(d+ex^r)^2 (a+b\log(cx^n))\,dx = \frac{1}{4}x^2\left(bn\left(-d^2 - \frac{8dex^r}{(2+r)^2} - \frac{e^2x^{2r}}{(1+r)^2}\right) + 2a\left(d^2 + \frac{4dex^r}{2+r} + \frac{e^2x^{2r}}{1+r}\right) + 2b\left(d^2 + \frac{4dex^r}{2+r} + \frac{e^2x^{2r}}{1+r}\right)\log(cx^n)\right)$$

input
```
Integrate[x*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(b*n*(-d^2 - (8*d*e*x^r)/(2 + r)^2 - (e^2*x^(2*r))/(1 + r)^2) + 2*a*(
d^2 + (4*d*e*x^r)/(2 + r) + (e^2*x^(2*r))/(1 + r)) + 2*b*(d^2 + (4*d*e*x^r
)/(2 + r) + (e^2*x^(2*r))/(1 + r))*Log[c*x^n]))/4
```

3.381.3 Rubi [A] (verified)

Time = 0.34 (sec) , antiderivative size = 103, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.190$, Rules used = {2771, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex^r)^2 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{2}\left(d^2x^2+\frac{4dex^{r+2}}{r+2}+\frac{e^2x^{2(r+1)}}{r+1}\right)(a+b\log(cx^n))-bn\int \frac{1}{2}x\left(\frac{4dex^r}{r+2}+\frac{e^2x^{2r}}{r+1}+d^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\left(d^2x^2+\frac{4dex^{r+2}}{r+2}+\frac{e^2x^{2(r+1)}}{r+1}\right)(a+b\log(cx^n))-\frac{1}{2}bn\int x\left(\frac{4dex^r}{r+2}+\frac{e^2x^{2r}}{r+1}+d^2\right)dx$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{2}\left(d^2x^2+\frac{4dex^{r+2}}{r+2}+\frac{e^2x^{2(r+1)}}{r+1}\right)(a+b\log(cx^n))-\frac{1}{2}bn\int \left(\frac{4dex^{r+1}}{r+2}+\frac{e^2x^{2r+1}}{r+1}+d^2x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(d^2x^2+\frac{4dex^{r+2}}{r+2}+\frac{e^2x^{2(r+1)}}{r+1}\right)(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d^2x^2}{2}+\frac{4dex^{r+2}}{(r+2)^2}+\frac{e^2x^{2(r+1)}}{2(r+1)^2}\right)$$

input
```
Int[x*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/2*(b*n*((d^2*x^2)/2 + (e^2*x^(2*(1 + r)))/(2*(1 + r)^2) + (4*d*e*x^(2 +
 r))/(2 + r)^2)) + ((d^2*x^2 + (e^2*x^(2*(1 + r)))/(1 + r) + (4*d*e*x^(2 +
 r))/(2 + r))*(a + b*Log[c*x^n]))/2
```

3.381.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.381.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 576 vs. 2(96) = 192.

Time = 1.79 (sec) , antiderivative size = 577, normalized size of antiderivative = 5.66

method	result
parallelrisch	$-\frac{6x^2 b\,d^2 n\,r^3+13x^2 b\,d^2 n\,r^2+12x^2 b\,d^2 nr-16x^2 x^r ade-2x^2\ln(c\,x^n)b\,d^2 r^4-12x^2\ln(c\,x^n)b\,d^2 r^3-26x^2\ln(c\,x^n)b\,d^2 r^2-24x^2\ln}{}$
risch	Expression too large to display

input
```
int(x*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/4*(6*x^2*b*d^2*n*r^3+13*x^2*b*d^2*n*r^2+12*x^2*b*d^2*n*r-16*x^2*x^r*a*d
*e-2*x^2*(x^r)^2*a*e^2*r^3-10*x^2*(x^r)^2*a*e^2*r^2-16*x^2*(x^r)^2*a*e^2*r
+4*x^2*(x^r)^2*b*e^2*n-2*x^2*ln(c*x^n)*b*d^2*r^4-12*x^2*ln(c*x^n)*b*d^2*r^
3-26*x^2*ln(c*x^n)*b*d^2*r^2-24*x^2*ln(c*x^n)*b*d^2*r-8*x^2*(x^r)^2*ln(c*x
^n)*b*e^2-8*x^2*b*ln(c*x^n)*d^2-8*a*d^2*x^2-32*x^2*x^r*a*d*e*r^2-40*x^2*x^
r*a*d*e*r+8*x^2*x^r*b*d*e*n+x^2*(x^r)^2*b*e^2*n*r^2+4*x^2*(x^r)^2*b*e^2*n*
r-2*x^2*(x^r)^2*ln(c*x^n)*b*e^2*r^3-10*x^2*(x^r)^2*ln(c*x^n)*b*e^2*r^2-16*
x^2*(x^r)^2*ln(c*x^n)*b*e^2*r-8*x^2*x^r*a*d*e*r^3+x^2*b*d^2*n*r^4+8*x^2*x^
r*b*d*e*n*r^2+16*x^2*x^r*b*d*e*n*r-8*x^2*x^r*ln(c*x^n)*b*d*e*r^3-32*x^2*x^
r*ln(c*x^n)*b*d*e*r^2-40*x^2*x^r*ln(c*x^n)*b*d*e*r-16*x^2*x^r*ln(c*x^n)*b*
d*e-2*x^2*a*d^2*r^4-12*x^2*a*d^2*r^3-26*x^2*a*d^2*r^2-24*x^2*a*d^2*r-8*x^2
*(x^r)^2*a*e^2+4*b*d^2*n*x^2)/(1+r)^2/(2+r)^2
```

3.381.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 488 vs. $2(96) = 192$.

Time = 0.30 (sec) , antiderivative size = 488, normalized size of antiderivative = 4.78

$$\int x(d+ex^r)^2\,(a+b\log(cx^n))\,dx$$
$$= \frac{2\,(bd^2r^4+6\,bd^2r^3+13\,bd^2r^2+12\,bd^2r+4\,bd^2)x^2\log(c)+2\,(bd^2nr^4+6\,bd^2nr^3+13\,bd^2nr^2+12\,bd^2nr+}{}$$

input
```
integrate(x*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/4*(2*(b*d^2*r^4 + 6*b*d^2*r^3 + 13*b*d^2*r^2 + 12*b*d^2*r + 4*b*d^2)*x^2
*log(c) + 2*(b*d^2*n*r^4 + 6*b*d^2*n*r^3 + 13*b*d^2*n*r^2 + 12*b*d^2*n*r +
 4*b*d^2*n)*x^2*log(x) - ((b*d^2*n - 2*a*d^2)*r^4 + 4*b*d^2*n + 6*(b*d^2*n
 - 2*a*d^2)*r^3 - 8*a*d^2 + 13*(b*d^2*n - 2*a*d^2)*r^2 + 12*(b*d^2*n - 2*a
*d^2)*r)*x^2 + (2*(b*e^2*r^3 + 5*b*e^2*r^2 + 8*b*e^2*r + 4*b*e^2)*x^2*log(
c) + 2*(b*e^2*n*r^3 + 5*b*e^2*n*r^2 + 8*b*e^2*n*r + 4*b*e^2*n)*x^2*log(x)
+ (2*a*e^2*r^3 - 4*b*e^2*n + 8*a*e^2 - (b*e^2*n - 10*a*e^2)*r^2 - 4*(b*e^2
*n - 4*a*e^2)*r)*x^2)*x^(2*r) + 8*((b*d*e*r^3 + 4*b*d*e*r^2 + 5*b*d*e*r +
2*b*d*e)*x^2*log(c) + (b*d*e*n*r^3 + 4*b*d*e*n*r^2 + 5*b*d*e*n*r + 2*b*d*e
*n)*x^2*log(x) + (a*d*e*r^3 - b*d*e*n + 2*a*d*e - (b*d*e*n - 4*a*d*e)*r^2
- (2*b*d*e*n - 5*a*d*e)*r)*x^2)*x^r)/(r^4 + 6*r^3 + 13*r^2 + 12*r + 4)
```

3.381.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1622 vs. $2(97) = 194$.

Time = 1.73 (sec) , antiderivative size = 1622, normalized size of antiderivative = 15.90

$$\int x(d+ex^r)^2 (a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d**2*x**2/2 + 2*a*d*e*log(c*x**n)/n - a*e**2/(2*x**2) - b*d**
2*n*x**2/4 + b*d**2*x**2*log(c*x**n)/2 + b*d*e*log(c*x**n)**2/n - b*e**2*n
/(4*x**2) - b*e**2*log(c*x**n)/(2*x**2), Eq(r, -2)), (a*d**2*x**2/2 + 2*a*
d*e*x + a*e**2*log(c*x**n)/n - b*d**2*n*x**2/4 + b*d**2*x**2*log(c*x**n)/2
 - 2*b*d*e*n*x + 2*b*d*e*x*log(c*x**n) + b*e**2*log(c*x**n)**2/(2*n), Eq(r
, -1)), (2*a*d**2*r**4*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 12*
a*d**2*r**3*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 26*a*d**2*r**2
*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 24*a*d**2*r*x**2/(4*r**4
+ 24*r**3 + 52*r**2 + 48*r + 16) + 8*a*d**2*x**2/(4*r**4 + 24*r**3 + 52*r*
*2 + 48*r + 16) + 8*a*d*e*r**3*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2 + 48*
r + 16) + 32*a*d*e*r**2*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16)
 + 40*a*d*e*r*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 16*a*d*
e*x**2*x**r/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 2*a*e**2*r**3*x**2*
x**(2*r)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 10*a*e**2*r**2*x**2*x*
*(2*r)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 16*a*e**2*r*x**2*x**(2*r
)/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) + 8*a*e**2*x**2*x**(2*r)/(4*r**
4 + 24*r**3 + 52*r**2 + 48*r + 16) - b*d**2*n*r**4*x**2/(4*r**4 + 24*r**3
+ 52*r**2 + 48*r + 16) - 6*b*d**2*n*r**3*x**2/(4*r**4 + 24*r**3 + 52*r**2
+ 48*r + 16) - 13*b*d**2*n*r**2*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r +
16) - 12*b*d**2*n*r*x**2/(4*r**4 + 24*r**3 + 52*r**2 + 48*r + 16) - 4*b...
```

3.381.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.45

$$\int x(d+ex^r)^2 (a+b\log(cx^n))\,dx = -\frac{1}{4}\,bd^2nx^2 + \frac{1}{2}\,bd^2x^2\log(cx^n) + \frac{1}{2}\,ad^2x^2 + \frac{be^2x^{2\,r+2}\log(cx^n)}{2\,(r+1)} + \frac{2\,bdex^{r+2}\log(cx^n)}{r+2} - \frac{be^2nx^{2\,r+2}}{4\,(r+1)^2} + \frac{ae^2x^{2\,r+2}}{2\,(r+1)} - \frac{2\,bdenx^{r+2}}{(r+2)^2} + \frac{2\,adex^{r+2}}{r+2}$$

input
```
integrate(x*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/4*b*d^2*n*x^2 + 1/2*b*d^2*x^2*log(c*x^n) + 1/2*a*d^2*x^2 + 1/2*b*e^2*x^
(2*r + 2)*log(c*x^n)/(r + 1) + 2*b*d*e*x^(r + 2)*log(c*x^n)/(r + 2) - 1/4*
b*e^2*n*x^(2*r + 2)/(r + 1)^2 + 1/2*a*e^2*x^(2*r + 2)/(r + 1) - 2*b*d*e*n*
x^(r + 2)/(r + 2)^2 + 2*a*d*e*x^(r + 2)/(r + 2)
```

3.381.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 744 vs. $2(96) = 192$.

Time = 0.31 (sec) , antiderivative size = 744, normalized size of antiderivative = 7.29

$$\int x(d+ex^r)^2 (a+b\log(cx^n))\,dx$$
$$= \frac{2\,be^2nr^3x^2x^{2\,r}\log(x)+8\,bdenr^3x^2x^r\log(x)+2\,bd^2nr^4x^2\log(x)-bd^2nr^4x^2+2\,be^2r^3x^2x^{2\,r}\log(c)+8\,bd}{}$$

input
```
integrate(x*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*(2*b*e^2*n*r^3*x^2*x^(2*r)*log(x) + 8*b*d*e*n*r^3*x^2*x^r*log(x) + 2*b
*d^2*n*r^4*x^2*log(x) - b*d^2*n*r^4*x^2 + 2*b*e^2*r^3*x^2*x^(2*r)*log(c) +
 8*b*d*e*r^3*x^2*x^r*log(c) + 2*b*d^2*r^4*x^2*log(c) + 10*b*e^2*n*r^2*x^2*
x^(2*r)*log(x) + 32*b*d*e*n*r^2*x^2*x^r*log(x) + 12*b*d^2*n*r^3*x^2*log(x)
 - b*e^2*n*r^2*x^2*x^(2*r) + 2*a*e^2*r^3*x^2*x^(2*r) - 8*b*d*e*n*r^2*x^2*x
^r + 8*a*d*e*r^3*x^2*x^r - 6*b*d^2*n*r^3*x^2 + 2*a*d^2*r^4*x^2 + 10*b*e^2*
r^2*x^2*x^(2*r)*log(c) + 32*b*d*e*r^2*x^2*x^r*log(c) + 12*b*d^2*r^3*x^2*lo
g(c) + 16*b*e^2*n*r*x^2*x^(2*r)*log(x) + 40*b*d*e*n*r*x^2*x^r*log(x) + 26*
b*d^2*n*r^2*x^2*log(x) - 4*b*e^2*n*r*x^2*x^(2*r) + 10*a*e^2*r^2*x^2*x^(2*r
) - 16*b*d*e*n*r*x^2*x^r + 32*a*d*e*r^2*x^2*x^r - 13*b*d^2*n*r^2*x^2 + 12*
a*d^2*r^3*x^2 + 16*b*e^2*r*x^2*x^(2*r)*log(c) + 40*b*d*e*r*x^2*x^r*log(c)
+ 26*b*d^2*r^2*x^2*log(c) + 8*b*e^2*n*x^2*x^(2*r)*log(x) + 16*b*d*e*n*x^2*
x^r*log(x) + 24*b*d^2*n*r*x^2*log(x) - 4*b*e^2*n*x^2*x^(2*r) + 16*a*e^2*r*
x^2*x^(2*r) - 8*b*d*e*n*x^2*x^r + 40*a*d*e*r*x^2*x^r - 12*b*d^2*n*r*x^2 +
26*a*d^2*r^2*x^2 + 8*b*e^2*x^2*x^(2*r)*log(c) + 16*b*d*e*x^2*x^r*log(c) +
24*b*d^2*r*x^2*log(c) + 8*b*d^2*n*x^2*log(x) + 8*a*e^2*x^2*x^(2*r) + 16*a*
d*e*x^2*x^r - 4*b*d^2*n*x^2 + 24*a*d^2*r*x^2 + 8*b*d^2*x^2*log(c) + 8*a*d^
2*x^2)/(r^4 + 6*r^3 + 13*r^2 + 12*r + 4)
```

3.381.9 Mupad [F(-1)]

Timed out.

$$\int x(d+ex^r)^2\,(a+b\log{(cx^n)})\;dx=\int x\,{\left(d+e\,x^r\right)}^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int(x*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.382 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x} dx$

3.382.1 Optimal result

Integrand size = 23, antiderivative size = 104

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x} dx = -\frac{2bdenx^r}{r^2} - \frac{be^2nx^{2r}}{4r^2} - \frac{1}{2}bd^2n\log^2(x) + \frac{2dex^r(a+b\log(cx^n))}{r} + \frac{e^2x^{2r}(a+b\log(cx^n))}{2r} + d^2\log(x)(a+b\log(cx^n))$$

output
```
-2*b*d*e*n*x^r/r^2-1/4*b*e^2*n*x^(2*r)/r^2-1/2*b*d^2*n*ln(x)^2+2*d*e*x^r*(
a+b*ln(c*x^n))/r+1/2*e^2*x^(2*r)*(a+b*ln(c*x^n))/r+d^2*ln(x)*(a+b*ln(c*x^n
))
```

3.382.2 Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 90, normalized size of antiderivative = 0.87

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x} dx = \frac{1}{4}\left(\frac{ex^r(2ar(4d+ex^r)-bn(8d+ex^r))}{r^2} + 4ad^2\log(x) + \frac{2bex^r(4d+ex^r)\log(cx^n)}{r} + \frac{2bd^2\log^2(cx^n)}{n}\right)$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
((e*x^r*(2*a*r*(4*d + e*x^r) - b*n*(8*d + e*x^r)))/r^2 + 4*a*d^2*Log[x] +
(2*b*e*x^r*(4*d + e*x^r)*Log[c*x^n])/r + (2*b*d^2*Log[c*x^n]^2)/n)/4
```

3.382.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.02, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \frac{e(ex^r+4d)x^r+2d^2r\log(x)}{2rx}dx+d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{e(ex^r+4d)x^r+2d^2r\log(x)}{x}dx}{2r}+d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}$$

$$\Big\downarrow \text{2010}$$

$$-\frac{bn\int \left(4dex^{r-1}+e^2x^{2r-1}+\frac{2d^2r\log(x)}{x}\right)dx}{2r}+d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}$$

$$\Big\downarrow \text{2009}$$

$$d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}-\frac{bn\left(d^2r\log^2(x)+\frac{4dex^r}{r}+\frac{e^2x^{2r}}{2r}\right)}{2r}$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
-1/2*(b*n*((4*d*e*x^r)/r + (e^2*x^(2*r))/(2*r) + d^2*r*Log[x]^2))/r + (2*d
*e*x^r*(a + b*Log[c*x^n]))/r + (e^2*x^(2*r)*(a + b*Log[c*x^n]))/(2*r) + d^
2*Log[x]*(a + b*Log[c*x^n])
```

3.382.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.382.4 Maple [A] (verified)

Time = 1.44 (sec) , antiderivative size = 122, normalized size of antiderivative = 1.17

method	result
parallelrisch	$\frac{2x^{2r}\ln(c\,x^n)b\,e^2rn+4\ln(x)a\,d^2n\,r^2+2x^{2r}a\,e^2nr-x^{2r}b\,e^2n^2+8x^r\ln(c\,x^n)bdern+2b\,d^2\ln(c\,x^n)^2r^2+8x^r adenr-8x^r bde\,n^2}{4r^2n}$
risch	$\frac{b\left(2d^2\ln(x)r+e^2x^{2r}+4de\,x^r\right)\ln(x^n)}{2r}+\frac{i\pi b\,e^2\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)^2x^{2r}}{4r}-\frac{i\pi bde\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)x^r}{r}-\frac{i\pi b\,e}{}$

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/4*(2*(x^r)^2*ln(c*x^n)*b*e^2*r*n+4*ln(x)*a*d^2*n*r^2+2*(x^r)^2*a*e^2*n*r
-(x^r)^2*b*e^2*n^2+8*x^r*ln(c*x^n)*b*d*e*r*n+2*b*d^2*ln(c*x^n)^2*r^2+8*x^r
*a*d*e*n*r-8*x^r*b*d*e*n^2)/r^2/n
```

3.382.5 Fricas [A] (verification not implemented)

Time = 0.29 (sec) , antiderivative size = 115, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x}\,dx$$
$$= \frac{2\,bd^2nr^2\log(x)^2 + (2\,be^2nr\log(x) + 2\,be^2r\log(c) - be^2n + 2\,ae^2r)x^{2\,r} + 8\,(bdenr\log(x) + bder\log(c) -}{4\,r^2}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/4*(2*b*d^2*n*r^2*log(x)^2 + (2*b*e^2*n*r*log(x) + 2*b*e^2*r*log(c) - b*e
^2*n + 2*a*e^2*r)*x^(2*r) + 8*(b*d*e*n*r*log(x) + b*d*e*r*log(c) - b*d*e*n
 + a*d*e*r)*x^r + 4*(b*d^2*r^2*log(c) + a*d^2*r^2)*log(x))/r^2
```

3.382.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 216 vs. 2(104) = 208.

Time = 2.44 (sec) , antiderivative size = 216, normalized size of antiderivative = 2.08

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x}\,dx$$
$$= \begin{cases} (a+b\log(c))\,(d+e)^2\log(x) & \text{for } n=0 \wedge \\ (a+b\log(c))\left(d^2\log(x) + \frac{2dex^r}{r} + \frac{e^2x^{2r}}{2r}\right) & \text{for } n=0 \\ (d+e)^2\left(\begin{cases} a\log(x) & \text{for } b=0 \\ -(-a-b\log(c))\log(x) & \text{for } n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right) & \text{for } r=0 \\ \frac{ad^2\log(cx^n)}{n} + \frac{2adex^r}{r} + \frac{ae^2x^{2r}}{2r} + \frac{bd^2\log(cx^n)^2}{2n} - \frac{2bdenx^r}{r^2} + \frac{2bdex^r\log(cx^n)}{r} - \frac{be^2nx^{2r}}{4r^2} + \frac{be^2x^{2r}\log(cx^n)}{2r} & \text{otherwise} \end{cases}$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise(((a + b*log(c))*(d + e)**2*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b
*log(c))*(d**2*log(x) + 2*d*e*x**r/r + e**2*x**(2*r)/(2*r)), Eq(n, 0)), ((
d + e)**2*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n,
0)), ((-a - b*log(c*x**n))**2/(2*b*n), True)), Eq(r, 0)), (a*d**2*log(c*x*
*n)/n + 2*a*d*e*x**r/r + a*e**2*x**(2*r)/(2*r) + b*d**2*log(c*x**n)**2/(2*
n) - 2*b*d*e*n*x**r/r**2 + 2*b*d*e*x**r*log(c*x**n)/r - b*e**2*n*x**(2*r)/
(4*r**2) + b*e**2*x**(2*r)*log(c*x**n)/(2*r), True))
```

3.382.7 Maxima [A] (verification not implemented)

Time = 0.33 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x}\,dx = \frac{be^2x^{2r}\log(cx^n)}{2r} + \frac{2\,bdex^r\log(cx^n)}{r} + \frac{bd^2\log(cx^n)^2}{2n} + ad^2\log(x) - \frac{be^2nx^{2r}}{4r^2} + \frac{ae^2x^{2r}}{2r} - \frac{2\,bdenx^r}{r^2} + \frac{2\,adex^r}{r}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/2*b*e^2*x^(2*r)*log(c*x^n)/r + 2*b*d*e*x^r*log(c*x^n)/r + 1/2*b*d^2*log(
c*x^n)^2/n + a*d^2*log(x) - 1/4*b*e^2*n*x^(2*r)/r^2 + 1/2*a*e^2*x^(2*r)/r
- 2*b*d*e*n*x^r/r^2 + 2*a*d*e*x^r/r
```

3.382.8 Giac [F]

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x, x)
```

3.382.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x}\,dx = \int \frac{(d+e\,x^r)^2 \,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x, x)
```

3.383 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^3}\,dx$

3.383.1 Optimal result

Integrand size = 23, antiderivative size = 135

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{bd^2n}{4x^2}-\frac{be^2nx^{-2(1-r)}}{4(1-r)^2}-\frac{2bdenx^{-2+r}}{(2-r)^2}-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{e^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{2dex^{-2+r}(a+b\log(cx^n))}{2-r}$$

output
```
-1/4*b*d^2*n/x^2-1/4*b*e^2*n/(1-r)^2/(x^(2-2*r))-2*b*d*e*n*x^(-2+r)/(2-r)^
2-1/2*d^2*(a+b*ln(c*x^n))/x^2-1/2*e^2*(a+b*ln(c*x^n))/(1-r)/(x^(2-2*r))-2*
d*e*x^(-2+r)*(a+b*ln(c*x^n))/(2-r)
```

3.383.2 Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 120, normalized size of antiderivative = 0.89

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^3}\,dx = \frac{bn\left(-d^2-\frac{8dex^r}{(-2+r)^2}-\frac{e^2x^{2r}}{(-1+r)^2}\right)+a\left(-2d^2+\frac{8dex^r}{-2+r}+\frac{2e^2x^{2r}}{-1+r}\right)+2b\left(-d^2+\frac{4dex^r}{-2+r}+\frac{e^2x^{2r}}{-1+r}\right)\log(cx^n)}{4x^2}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-d^2 - (8*d*e*x^r)/(-2 + r)^2 - (e^2*x^(2*r))/(-1 + r)^2) + a*(-2*d^
2 + (8*d*e*x^r)/(-2 + r) + (2*e^2*x^(2*r))/(-1 + r)) + 2*b*(-d^2 + (4*d*e*
x^r)/(-2 + r) + (e^2*x^(2*r))/(-1 + r))*Log[c*x^n])/(4*x^2)
```

3.383.3 Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 166, normalized size of antiderivative = 1.23, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^3}dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int -\frac{4de(1-r)x^r+e^2(2-r)x^{2r}+d^2(1-r)(2-r)}{2(r^2-3r+2)x^3}dx-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{2dex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{e^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{bn\int \frac{4de(1-r)x^r+e^2(2-r)x^{2r}+d^2(1-r)(2-r)}{x^3}dx}{2(r^2-3r+2)}-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{2dex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{e^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}$$

$$\Big\downarrow \text{ 1691}$$

$$\frac{bn\int \left(-4de(r-1)x^{r-3}-e^2(r-2)x^{2r-3}+\frac{d^2(r-2)(r-1)}{x^3}\right)dx}{2(r^2-3r+2)}-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{2dex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{e^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{2x^2}-\frac{2dex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{e^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}+\frac{bn\left(-\frac{d^2(1-r)(2-r)}{2x^2}-\frac{4de(1-r)x^{r-2}}{2-r}-\frac{e^2(2-r)x^{-2(1-r)}}{2(1-r)}\right)}{2(r^2-3r+2)}$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-1/2*(d^2*(1 - r)*(2 - r))/x^2 - (e^2*(2 - r))/(2*(1 - r)*x^(2*(1 -
r))) - (4*d*e*(1 - r)*x^(-2 + r))/(2 - r)))/(2*(2 - 3*r + r^2)) - (d^2*(a
+ b*Log[c*x^n]))/(2*x^2) - (e^2*(a + b*Log[c*x^n]))/(2*(1 - r)*x^(2*(1 - r
))) - (2*d*e*x^(-2 + r)*(a + b*Log[c*x^n]))/(2 - r)
```

3.383.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.383.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 473 vs. $2(127) = 254$.

Time = 1.15 (sec) , antiderivative size = 474, normalized size of antiderivative = 3.51

method	result
parallelrisch	$-\frac{8b\ln(cx^n)d^2+8bden\,x^r+13b\,d^2n\,r^2+16de\,x^r a-12b\,d^2nr+16de\,x^r b\ln(cx^n)+2a\,d^2r^4-12a\,d^2r^3-8ade\,r^3x^r+4b\,d^2n+8a\,d^2-}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
-1/4/x^2*(8*b*ln(c*x^n)*d^2-4*b*e^2*n*r*(x^r)^2+8*b*d*e*n*x^r+10*a*e^2*r^2
*(x^r)^2-16*a*e^2*r*(x^r)^2+4*b*e^2*n*(x^r)^2-2*a*e^2*r^3*(x^r)^2+8*e^2*(x
^r)^2*a+13*b*d^2*n*r^2+16*d*e*x^r*a+8*e^2*(x^r)^2*b*ln(c*x^n)-12*b*d^2*n*r
+16*d*e*x^r*b*ln(c*x^n)+2*a*d^2*r^4-12*a*d^2*r^3-8*a*d*e*r^3*x^r+4*b*d^2*n
+8*a*d^2+2*ln(c*x^n)*b*d^2*r^4-12*ln(c*x^n)*b*d^2*r^3+26*ln(c*x^n)*b*d^2*r
^2-24*ln(c*x^n)*b*d^2*r+b*d^2*n*r^4-6*b*d^2*n*r^3-16*b*d*e*n*r*x^r+26*a*d^
2*r^2-24*a*d^2*r-2*(x^r)^2*ln(c*x^n)*b*e^2*r^3+10*(x^r)^2*ln(c*x^n)*b*e^2*
r^2-16*(x^r)^2*ln(c*x^n)*b*e^2*r+8*b*d*e*n*r^2*x^r+32*a*d*e*r^2*x^r-40*a*d
*e*r*x^r+b*e^2*n*r^2*(x^r)^2-8*x^r*ln(c*x^n)*b*d*e*r^3+32*x^r*ln(c*x^n)*b*
d*e*r^2-40*x^r*ln(c*x^n)*b*d*e*r)/(-1+r)^2/(r^2-4*r+4)
```

3.383.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 457 vs. $2(119) = 238$.

Time = 0.30 (sec) , antiderivative size = 457, normalized size of antiderivative = 3.39

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^3}\,dx = -\frac{(bd^2n+2\,ad^2)r^4+4\,bd^2n-6\,(bd^2n+2\,ad^2)r^3+8\,ad^2+13\,(bd^2n+2\,ad^2)r^2-12\,(bd^2n+2\,ad^2)r-(2}{}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
-1/4*((b*d^2*n + 2*a*d^2)*r^4 + 4*b*d^2*n - 6*(b*d^2*n + 2*a*d^2)*r^3 + 8*
a*d^2 + 13*(b*d^2*n + 2*a*d^2)*r^2 - 12*(b*d^2*n + 2*a*d^2)*r - (2*a*e^2*r
^3 - 4*b*e^2*n - 8*a*e^2 - (b*e^2*n + 10*a*e^2)*r^2 + 4*(b*e^2*n + 4*a*e^2
)*r + 2*(b*e^2*r^3 - 5*b*e^2*r^2 + 8*b*e^2*r - 4*b*e^2)*log(c) + 2*(b*e^2*
n*r^3 - 5*b*e^2*n*r^2 + 8*b*e^2*n*r - 4*b*e^2*n)*log(x))*x^(2*r) - 8*(a*d*
e*r^3 - b*d*e*n - 2*a*d*e - (b*d*e*n + 4*a*d*e)*r^2 + (2*b*d*e*n + 5*a*d*e
)*r + (b*d*e*r^3 - 4*b*d*e*r^2 + 5*b*d*e*r - 2*b*d*e)*log(c) + (b*d*e*n*r^
3 - 4*b*d*e*n*r^2 + 5*b*d*e*n*r - 2*b*d*e*n)*log(x))*x^r + 2*(b*d^2*r^4 -
6*b*d^2*r^3 + 13*b*d^2*r^2 - 12*b*d^2*r + 4*b*d^2)*log(c) + 2*(b*d^2*n*r^4
 - 6*b*d^2*n*r^3 + 13*b*d^2*n*r^2 - 12*b*d^2*n*r + 4*b*d^2*n)*log(x))/((r^
4 - 6*r^3 + 13*r^2 - 12*r + 4)*x^2)
```

3.383.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 2118 vs. 2(119) = 238.

Time = 3.30 (sec) , antiderivative size = 2118, normalized size of antiderivative = 15.69

$$\int \frac{(d+ex^r)^2 (a+b\log (cx^n))}{x^3} dx = \text{Too large to display}$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**3,x)
```

output
```
Piecewise((-a*d**2/(2*x**2) - 2*a*d*e/x + a*e**2*log(x) + b*d**2*(-n/(4*x*
*2) - log(c*x**n)/(2*x**2)) + 2*b*d*e*(-n/x - log(c*x**n)/x) - b*e**2*Piec
ewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n), True)), Eq(r, 1)
), (-a*d**2/(2*x**2) + 2*a*d*e*log(c*x**n)/n + a*e**2*x**2/2 - b*d**2*n/(4
*x**2) - b*d**2*log(c*x**n)/(2*x**2) + b*d*e*log(c*x**n)**2/n - b*e**2*n*x
**2/4 + b*e**2*x**2*log(c*x**n)/2, Eq(r, 2)), (-2*a*d**2*r**4/(4*r**4*x**2
 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) + 12*a*d**2*r**3/(4*
r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 26*a*d**2
*r**2/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) +
24*a*d**2*r/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x*
*2) - 8*a*d**2/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16
*x**2) + 8*a*d*e*r**3*x**r/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48
*r*x**2 + 16*x**2) - 32*a*d*e*r**2*x**r/(4*r**4*x**2 - 24*r**3*x**2 + 52*r
**2*x**2 - 48*r*x**2 + 16*x**2) + 40*a*d*e*r*x**r/(4*r**4*x**2 - 24*r**3*x
**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 16*a*d*e*x**r/(4*r**4*x**2 - 2
4*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) + 2*a*e**2*r**3*x**(2*r)
/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2 + 16*x**2) - 10*a*
e**2*r**2*x**(2*r)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x**2 - 48*r*x**2
+ 16*x**2) + 16*a*e**2*r*x**(2*r)/(4*r**4*x**2 - 24*r**3*x**2 + 52*r**2*x*
*2 - 48*r*x**2 + 16*x**2) - 8*a*e**2*x**(2*r)/(4*r**4*x**2 - 24*r**3*x*...
```

3.383.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^2 (a+b\log (cx^n))}{x^3} dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-3>0)', see `assume?` for more
details)Is
```

3.383.8 Giac [F]

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^3}\,dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x^3, x)
```

3.383.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^3}\,dx = \int \frac{(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))}{x^3}\,dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^3,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^3, x)
```

3.384 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^5}\,dx$

3.384.1 Optimal result

Integrand size = 23, antiderivative size = 135

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^5}\,dx = -\frac{bd^2n}{16x^4}-\frac{be^2nx^{-2(2-r)}}{4(2-r)^2}-\frac{2bdenx^{-4+r}}{(4-r)^2}-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{e^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-\frac{2dex^{-4+r}(a+b\log(cx^n))}{4-r}$$

output
```
-1/16*b*d^2*n/x^4-1/4*b*e^2*n/(2-r)^2/(x^(4-2*r))-2*b*d*e*n*x^(-4+r)/(4-r)
^2-1/4*d^2*(a+b*ln(c*x^n))/x^4-1/2*e^2*(a+b*ln(c*x^n))/(2-r)/(x^(4-2*r))-2
*d*e*x^(-4+r)*(a+b*ln(c*x^n))/(4-r)
```

3.384.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 121, normalized size of antiderivative = 0.90

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^5}\,dx = \frac{bn\left(-d^2-\frac{32dex^r}{(-4+r)^2}-\frac{4e^2x^{2r}}{(-2+r)^2}\right)+a\left(-4d^2+\frac{32dex^r}{-4+r}+\frac{8e^2x^{2r}}{-2+r}\right)+4b\left(-d^2+\frac{8dex^r}{-4+r}+\frac{2e^2x^{2r}}{-2+r}\right)\log(cx^n)}{16x^4}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-d^2 - (32*d*e*x^r)/(-4 + r)^2 - (4*e^2*x^(2*r))/(-2 + r)^2) + a*(-4
*d^2 + (32*d*e*x^r)/(-4 + r) + (8*e^2*x^(2*r))/(-2 + r)) + 4*b*(-d^2 + (8*
d*e*x^r)/(-4 + r) + (2*e^2*x^(2*r))/(-2 + r))*Log[c*x^n])/(16*x^4)
```

3.384.3 Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 164, normalized size of antiderivative = 1.21, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^5}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{8de(2-r)x^r+2e^2(4-r)x^{2r}+d^2(2-r)(4-r)}{4(r^2-6r+8)x^5}dx-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2dex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{e^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}$$

$$\Big\downarrow \text{27}$$

$$\frac{bn\int\frac{8de(2-r)x^r+2e^2(4-r)x^{2r}+d^2(2-r)(4-r)}{x^5}dx}{4(r^2-6r+8)}-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2dex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{e^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}$$

$$\Big\downarrow \text{1691}$$

$$\frac{bn\int\left(-8de(r-2)x^{r-5}-2e^2(r-4)x^{2r-5}+\frac{d^2(r-4)(r-2)}{x^5}\right)dx}{4(r^2-6r+8)}-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2dex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{e^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{4x^4}-\frac{2dex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{e^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}+\frac{bn\left(-\frac{d^2(2-r)(4-r)}{4x^4}-\frac{8de(2-r)x^{r-4}}{4-r}-\frac{e^2(4-r)x^{-2(2-r)}}{2-r}\right)}{4(r^2-6r+8)}$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-1/4*(d^2*(2 - r)*(4 - r))/x^4 - (e^2*(4 - r))/((2 - r)*x^(2*(2 - r)
)) - (8*d*e*(2 - r)*x^(-4 + r))/(4 - r)))/(4*(8 - 6*r + r^2)) - (d^2*(a +
b*Log[c*x^n]))/(4*x^4) - (e^2*(a + b*Log[c*x^n]))/(2*(2 - r)*x^(2*(2 - r))
) - (2*d*e*x^(-4 + r)*(a + b*Log[c*x^n]))/(4 - r)
```

3.384.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.384.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 474 vs. $2(127) = 254$.

Time = 1.10 (sec) , antiderivative size = 475, normalized size of antiderivative = 3.52

method	result
parallelrisch	$-\frac{256b\ln(c\,x^n)d^2+128bden\,x^r+52b\,d^2n\,r^2+512de\,x^r a-96b\,d^2nr+512de\,x^r b\ln(c\,x^n)+4a\,d^2r^4-48a\,d^2r^3-32ade\,r^3x^r+64b\,d^2}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output
```
-1/16/x^4*(256*b*ln(c*x^n)*d^2-32*b*e^2*n*r*(x^r)^2+128*b*d*e*n*x^r+80*a*e
^2*r^2*(x^r)^2-256*a*e^2*r*(x^r)^2+64*b*e^2*n*(x^r)^2-8*a*e^2*r^3*(x^r)^2+
256*e^2*(x^r)^2*a+52*b*d^2*n*r^2+512*d*e*x^r*a+256*e^2*(x^r)^2*b*ln(c*x^n)
-96*b*d^2*n*r+512*d*e*x^r*b*ln(c*x^n)+4*a*d^2*r^4-48*a*d^2*r^3-32*a*d*e*r^
3*x^r+64*b*d^2*n+256*a*d^2+4*ln(c*x^n)*b*d^2*r^4-48*ln(c*x^n)*b*d^2*r^3+20
8*ln(c*x^n)*b*d^2*r^2-384*ln(c*x^n)*b*d^2*r+b*d^2*n*r^4-12*b*d^2*n*r^3-128
*b*d*e*n*r*x^r+208*a*d^2*r^2-384*a*d^2*r-8*(x^r)^2*ln(c*x^n)*b*e^2*r^3+80*
(x^r)^2*ln(c*x^n)*b*e^2*r^2-256*(x^r)^2*ln(c*x^n)*b*e^2*r+32*b*d*e*n*r^2*x
^r+256*a*d*e*r^2*x^r-640*a*d*e*r*x^r+4*b*e^2*n*r^2*(x^r)^2-32*x^r*ln(c*x^n
)*b*d*e*r^3+256*x^r*ln(c*x^n)*b*d*e*r^2-640*x^r*ln(c*x^n)*b*d*e*r)/(-2+r)^
2/(r^2-8*r+16)
```

3.384.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 457 vs. $2(119) = 238$.

Time = 0.30 (sec) , antiderivative size = 457, normalized size of antiderivative = 3.39

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^5} dx = -\frac{(bd^2n+4\,ad^2)r^4+64\,bd^2n-12\,(bd^2n+4\,ad^2)r^3+256\,ad^2+52\,(bd^2n+4\,ad^2)r^2-96\,(bd^2n+4\,ad^2)r}{}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
-1/16*((b*d^2*n + 4*a*d^2)*r^4 + 64*b*d^2*n - 12*(b*d^2*n + 4*a*d^2)*r^3 +
 256*a*d^2 + 52*(b*d^2*n + 4*a*d^2)*r^2 - 96*(b*d^2*n + 4*a*d^2)*r - 4*(2*
a*e^2*r^3 - 16*b*e^2*n - 64*a*e^2 - (b*e^2*n + 20*a*e^2)*r^2 + 8*(b*e^2*n
+ 8*a*e^2)*r + 2*(b*e^2*r^3 - 10*b*e^2*r^2 + 32*b*e^2*r - 32*b*e^2)*log(c)
 + 2*(b*e^2*n*r^3 - 10*b*e^2*n*r^2 + 32*b*e^2*n*r - 32*b*e^2*n)*log(x))*x^
(2*r) - 32*(a*d*e*r^3 - 4*b*d*e*n - 16*a*d*e - (b*d*e*n + 8*a*d*e)*r^2 + 4
*(b*d*e*n + 5*a*d*e)*r + (b*d*e*r^3 - 8*b*d*e*r^2 + 20*b*d*e*r - 16*b*d*e)
*log(c) + (b*d*e*n*r^3 - 8*b*d*e*n*r^2 + 20*b*d*e*n*r - 16*b*d*e*n)*log(x)
)*x^r + 4*(b*d^2*r^4 - 12*b*d^2*r^3 + 52*b*d^2*r^2 - 96*b*d^2*r + 64*b*d^2
)*log(c) + 4*(b*d^2*n*r^4 - 12*b*d^2*n*r^3 + 52*b*d^2*n*r^2 - 96*b*d^2*n*r
 + 64*b*d^2*n)*log(x))/((r^4 - 12*r^3 + 52*r^2 - 96*r + 64)*x^4)
```

3.384.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 2127 vs. 2(119) = 238.

Time = 4.82 (sec) , antiderivative size = 2127, normalized size of antiderivative = 15.76

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^5}\,dx = \text{Too large to display}$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**5,x)
```

output
```
Piecewise((-a*d**2/(4*x**4) - a*d*e/x**2 + a*e**2*log(x) + b*d**2*(-n/(16*
x**4) - log(c*x**n)/(4*x**4)) + 2*b*d*e*(-n/(4*x**2) - log(c*x**n)/(2*x**2
)) - b*e**2*Piecewise((-log(c)*log(x), Eq(n, 0)), (-log(c*x**n)**2/(2*n),
True)), Eq(r, 2)), (-a*d**2/(4*x**4) + 2*a*d*e*log(c*x**n)/n + a*e**2*x**4
/4 - b*d**2*n/(16*x**4) - b*d**2*log(c*x**n)/(4*x**4) + b*d*e*log(c*x**n)*
*2/n - b*e**2*n*x**4/16 + b*e**2*x**4*log(c*x**n)/4, Eq(r, 4)), (-4*a*d**2
*r**4/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x
**4) + 48*a*d**2*r**3/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536
*r*x**4 + 1024*x**4) - 208*a*d**2*r**2/(16*r**4*x**4 - 192*r**3*x**4 + 832
*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 384*a*d**2*r/(16*r**4*x**4 - 192*r
**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 256*a*d**2/(16*r**4*
x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 32*a*d*e
*r**3*x**r/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1
024*x**4) - 256*a*d*e*r**2*x**r/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x
**4 - 1536*r*x**4 + 1024*x**4) + 640*a*d*e*r*x**r/(16*r**4*x**4 - 192*r**3
*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) - 512*a*d*e*x**r/(16*r**4
*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 8*a*e**
2*r**3*x**(2*r)/(16*r**4*x**4 - 192*r**3*x**4 + 832*r**2*x**4 - 1536*r*x**
4 + 1024*x**4) - 80*a*e**2*r**2*x**(2*r)/(16*r**4*x**4 - 192*r**3*x**4 + 8
32*r**2*x**4 - 1536*r*x**4 + 1024*x**4) + 256*a*e**2*r*x**(2*r)/(16*r**...
```

3.384.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^5}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-5>0)', see `assume?` for more
details)Is
```

3.384.8 Giac [F]

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^5}\,dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x^5}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x^5, x)
```

3.384.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^5}\,dx = \int \frac{(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))}{x^5}\,dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^5,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^5, x)
```

3.385 $\int x^4(d+ex^r)^2(a+b\log(cx^n))\,dx$

3.385.1 Optimal result

Integrand size = 23, antiderivative size = 105

$$\int x^4(d+ex^r)^2(a+b\log(cx^n))\,dx=-\frac{1}{25}bd^2nx^5-\frac{2bdenx^{5+r}}{(5+r)^2}-\frac{be^2nx^{5+2r}}{(5+2r)^2}+\frac{1}{5}\left(d^2x^5+\frac{10dex^{5+r}}{5+r}+\frac{5e^2x^{5+2r}}{5+2r}\right)(a+b\log(cx^n))$$

output
```
-1/25*b*d^2*n*x^5-2*b*d*e*n*x^(5+r)/(5+r)^2-b*e^2*n*x^(5+2*r)/(5+2*r)^2+1/
5*(d^2*x^5+10*d*e*x^(5+r)/(5+r)+5*e^2*x^(5+2*r)/(5+2*r))*(a+b*ln(c*x^n))
```

3.385.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.18

$$\int x^4(d+ex^r)^2(a+b\log(cx^n))\,dx=\frac{1}{25}x^5\left(bn\left(-d^2-\frac{50dex^r}{(5+r)^2}-\frac{25e^2x^{2r}}{(5+2r)^2}\right)+5a\left(d^2+\frac{10dex^r}{5+r}+\frac{5e^2x^{2r}}{5+2r}\right)+5b\left(d^2+\frac{10dex^r}{5+r}+\frac{5e^2x^{2r}}{5+2r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^4*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^5*(b*n*(-d^2 - (50*d*e*x^r)/(5 + r)^2 - (25*e^2*x^(2*r))/(5 + 2*r)^2) +
 5*a*(d^2 + (10*d*e*x^r)/(5 + r) + (5*e^2*x^(2*r))/(5 + 2*r)) + 5*b*(d^2 +
 (10*d*e*x^r)/(5 + r) + (5*e^2*x^(2*r))/(5 + 2*r))*Log[c*x^n]))/25
```

3.385.3 Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2771, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4(d+ex^r)^2(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{5}\left(d^2x^5+\frac{10dex^{r+5}}{r+5}+\frac{5e^2x^{2r+5}}{2r+5}\right)(a+b\log(cx^n))-bn\int\frac{1}{5}x^4\left(\frac{10dex^r}{r+5}+\frac{5e^2x^{2r}}{2r+5}+d^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\left(d^2x^5+\frac{10dex^{r+5}}{r+5}+\frac{5e^2x^{2r+5}}{2r+5}\right)(a+b\log(cx^n))-\frac{1}{5}bn\int x^4\left(\frac{10dex^r}{r+5}+\frac{5e^2x^{2r}}{2r+5}+d^2\right)dx$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{5}\left(d^2x^5+\frac{10dex^{r+5}}{r+5}+\frac{5e^2x^{2r+5}}{2r+5}\right)(a+b\log(cx^n))-\frac{1}{5}bn\int\left(\frac{5e^2x^{2(r+2)}}{2r+5}+\frac{10dex^{r+4}}{r+5}+d^2x^4\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(d^2x^5+\frac{10dex^{r+5}}{r+5}+\frac{5e^2x^{2r+5}}{2r+5}\right)(a+b\log(cx^n))-\frac{1}{5}bn\left(\frac{d^2x^5}{5}+\frac{10dex^{r+5}}{(r+5)^2}+\frac{5e^2x^{2r+5}}{(2r+5)^2}\right)$$

input
```
Int[x^4*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/5*(b*n*((d^2*x^5)/5 + (10*d*e*x^(5 + r))/(5 + r)^2 + (5*e^2*x^(5 + 2*r)
)/(5 + 2*r)^2)) + ((d^2*x^5 + (10*d*e*x^(5 + r))/(5 + r) + (5*e^2*x^(5 + 2
*r))/(5 + 2*r))*(a + b*Log[c*x^n]))/5
```

3.385.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.385.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 585 vs. $2(101) = 202$.

Time = 9.10 (sec) , antiderivative size = 586, normalized size of antiderivative = 5.58

method	result
parallelrisch	$-\frac{-3125x^5 a d^2 - 6250bde \ln(c x^n) x^r r x^5 - 200x^5 x^r \ln(c x^n) bde r^3 - 2000x^5 x^r \ln(c x^n) bde r^2 - 625x^5 x^{2r} a e^2 r^2 + 625x^5 x^{2r} b e^2 n -}{}$
risch	Expression too large to display

input
```
int(x^4*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/25*(-3125*x^5*a*d^2-2500*e^2*b*ln(c*x^n)*(x^r)^2*x^5*r-6250*b*d*e*ln(c*
x^n)*x^r*r*x^5-625*x^5*(x^r)^2*a*e^2*r^2-200*x^5*x^r*ln(c*x^n)*b*d*e*r^3-2
000*x^5*x^r*ln(c*x^n)*b*d*e*r^2-20*x^5*a*d^2*r^4-300*x^5*a*d^2*r^3-1625*x^
5*a*d^2*r^2-3750*x^5*a*d^2*r+625*x^5*(x^r)^2*b*e^2*n+4*x^5*b*d^2*n*r^4+60*
x^5*b*d^2*n*r^3+325*x^5*b*d^2*n*r^2+750*x^5*b*d^2*n*r-6250*x^5*d*e*x^r*b*l
n(c*x^n)-3125*x^5*e^2*(x^r)^2*a-3125*x^5*b*ln(c*x^n)*d^2-3750*x^5*ln(c*x^n
)*b*d^2*r-6250*x^5*d*e*x^r*a-3125*x^5*e^2*(x^r)^2*b*ln(c*x^n)-2500*x^5*(x^
r)^2*a*e^2*r-50*x^5*(x^r)^2*ln(c*x^n)*b*e^2*r^3-625*x^5*(x^r)^2*ln(c*x^n)*
b*e^2*r^2-50*x^5*(x^r)^2*a*e^2*r^3-20*x^5*ln(c*x^n)*b*d^2*r^4-300*x^5*ln(c
*x^n)*b*d^2*r^3-1625*x^5*ln(c*x^n)*b*d^2*r^2+1250*x^5*x^r*b*d*e*n+25*x^5*(
x^r)^2*b*e^2*n*r^2+250*x^5*(x^r)^2*b*e^2*n*r+200*x^5*x^r*b*d*e*n*r^2+1000*
x^5*x^r*b*d*e*n*r+625*b*d^2*n*x^5-200*x^5*x^r*a*d*e*r^3-2000*x^5*x^r*a*d*e
*r^2-6250*x^5*x^r*a*d*e*r)/(r^2+10*r+25)/(5+2*r)^2
```

3.385.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 497 vs. $2(101) = 202$.

Time = 0.30 (sec) , antiderivative size = 497, normalized size of antiderivative = 4.73

$$\int x^4(d+ex^r)^2\,(a+b\log(cx^n))\,dx = \frac{5\,(4\,bd^2r^4+60\,bd^2r^3+325\,bd^2r^2+750\,bd^2r+625\,bd^2)x^5\log(c)+5\,(4\,bd^2nr^4+60\,bd^2nr^3+325\,bd^2nr^2+\cdots}{\cdots}$$

input
```
integrate(x^4*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/25*(5*(4*b*d^2*r^4 + 60*b*d^2*r^3 + 325*b*d^2*r^2 + 750*b*d^2*r + 625*b*
d^2)*x^5*log(c) + 5*(4*b*d^2*n*r^4 + 60*b*d^2*n*r^3 + 325*b*d^2*n*r^2 + 75
0*b*d^2*n*r + 625*b*d^2*n)*x^5*log(x) - (4*(b*d^2*n - 5*a*d^2)*r^4 + 625*b
*d^2*n + 60*(b*d^2*n - 5*a*d^2)*r^3 - 3125*a*d^2 + 325*(b*d^2*n - 5*a*d^2)
*r^2 + 750*(b*d^2*n - 5*a*d^2)*r)*x^5 + 25*((2*b*e^2*r^3 + 25*b*e^2*r^2 +
100*b*e^2*r + 125*b*e^2)*x^5*log(c) + (2*b*e^2*n*r^3 + 25*b*e^2*n*r^2 + 10
0*b*e^2*n*r + 125*b*e^2*n)*x^5*log(x) + (2*a*e^2*r^3 - 25*b*e^2*n + 125*a*
e^2 - (b*e^2*n - 25*a*e^2)*r^2 - 10*(b*e^2*n - 10*a*e^2)*r)*x^5)*x^(2*r) +
 50*((4*b*d*e*r^3 + 40*b*d*e*r^2 + 125*b*d*e*r + 125*b*d*e)*x^5*log(c) + (
4*b*d*e*n*r^3 + 40*b*d*e*n*r^2 + 125*b*d*e*n*r + 125*b*d*e*n)*x^5*log(x) +
 (4*a*d*e*r^3 - 25*b*d*e*n + 125*a*d*e - 4*(b*d*e*n - 10*a*d*e)*r^2 - 5*(4
*b*d*e*n - 25*a*d*e)*r)*x^5)*x^r)/(4*r^4 + 60*r^3 + 325*r^2 + 750*r + 625)
```

3.385.6 Sympy [F(-1)]

Timed out.

$$\int x^4(d+ex^r)^2\,(a+b\log{(cx^n)})\;dx=\text{Timed out}$$

input
```
integrate(x**4*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

3.385.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.45

$$\int x^4(d+ex^r)^2\,(a+b\log{(cx^n)})\;dx=-\frac{1}{25}\,bd^2nx^5+\frac{1}{5}\,bd^2x^5\log{(cx^n)}+\frac{1}{5}\,ad^2x^5+\frac{be^2x^{2\,r+5}\log{(cx^n)}}{2\,r+5}+\frac{2\,bdex^{r+5}\log{(cx^n)}}{r+5}-\frac{be^2nx^{2\,r+5}}{(2\,r+5)^2}+\frac{ae^2x^{2\,r+5}}{2\,r+5}-\frac{2\,bdenx^{r+5}}{(r+5)^2}+\frac{2\,adex^{r+5}}{r+5}$$

input
```
integrate(x^4*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*d^2*n*x^5 + 1/5*b*d^2*x^5*log(c*x^n) + 1/5*a*d^2*x^5 + b*e^2*x^(2*
r + 5)*log(c*x^n)/(2*r + 5) + 2*b*d*e*x^(r + 5)*log(c*x^n)/(r + 5) - b*e^2
*n*x^(2*r + 5)/(2*r + 5)^2 + a*e^2*x^(2*r + 5)/(2*r + 5) - 2*b*d*e*n*x^(r
+ 5)/(r + 5)^2 + 2*a*d*e*x^(r + 5)/(r + 5)
```

3.385.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 746 vs. 2(101) = 202.

Time = 0.35 (sec) , antiderivative size = 746, normalized size of antiderivative = 7.10

$$\int x^4(d+ex^r)^2\,(a+b\log{(cx^n)})\;dx=\frac{50\,be^2nr^3x^5x^{2\,r}\log{(x)}+200\,bdenr^3x^5x^r\log{(x)}+20\,bd^2nr^4x^5\log{(x)}-4\,bd^2nr^4x^5+50\,be^2r^3x^5x^{2\,r}\log{(c}$$

input
```
integrate(x^4*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/25*(50*b*e^2*n*r^3*x^5*x^(2*r)*log(x) + 200*b*d*e*n*r^3*x^5*x^r*log(x) +
 20*b*d^2*n*r^4*x^5*log(x) - 4*b*d^2*n*r^4*x^5 + 50*b*e^2*r^3*x^5*x^(2*r)*
log(c) + 200*b*d*e*r^3*x^5*x^r*log(c) + 20*b*d^2*r^4*x^5*log(c) + 625*b*e^
2*n*r^2*x^5*x^(2*r)*log(x) + 2000*b*d*e*n*r^2*x^5*x^r*log(x) + 300*b*d^2*n
*r^3*x^5*log(x) - 25*b*e^2*n*r^2*x^5*x^(2*r) + 50*a*e^2*r^3*x^5*x^(2*r) -
200*b*d*e*n*r^2*x^5*x^r + 200*a*d*e*r^3*x^5*x^r - 60*b*d^2*n*r^3*x^5 + 20*
a*d^2*r^4*x^5 + 625*b*e^2*r^2*x^5*x^(2*r)*log(c) + 2000*b*d*e*r^2*x^5*x^r*
log(c) + 300*b*d^2*r^3*x^5*log(c) + 2500*b*e^2*n*r*x^5*x^(2*r)*log(x) + 62
50*b*d*e*n*r*x^5*x^r*log(x) + 1625*b*d^2*n*r^2*x^5*log(x) - 250*b*e^2*n*r*
x^5*x^(2*r) + 625*a*e^2*r^2*x^5*x^(2*r) - 1000*b*d*e*n*r*x^5*x^r + 2000*a*
d*e*r^2*x^5*x^r - 325*b*d^2*n*r^2*x^5 + 300*a*d^2*r^3*x^5 + 2500*b*e^2*r*x
^5*x^(2*r)*log(c) + 6250*b*d*e*r*x^5*x^r*log(c) + 1625*b*d^2*r^2*x^5*log(c
) + 3125*b*e^2*n*x^5*x^(2*r)*log(x) + 6250*b*d*e*n*x^5*x^r*log(x) + 3750*b
*d^2*n*r*x^5*log(x) - 625*b*e^2*n*x^5*x^(2*r) + 2500*a*e^2*r*x^5*x^(2*r) -
 1250*b*d*e*n*x^5*x^r + 6250*a*d*e*r*x^5*x^r - 750*b*d^2*n*r*x^5 + 1625*a*
d^2*r^2*x^5 + 3125*b*e^2*x^5*x^(2*r)*log(c) + 6250*b*d*e*x^5*x^r*log(c) +
3750*b*d^2*r*x^5*log(c) + 3125*b*d^2*n*x^5*log(x) + 3125*a*e^2*x^5*x^(2*r)
 + 6250*a*d*e*x^5*x^r - 625*b*d^2*n*x^5 + 3750*a*d^2*r*x^5 + 3125*b*d^2*x^
5*log(c) + 3125*a*d^2*x^5)/(4*r^4 + 60*r^3 + 325*r^2 + 750*r + 625)
```

3.385.9 Mupad [F(-1)]

Timed out.

$$\int x^4(d+ex^r)^2\,(a+b\log{(cx^n)})\;dx=\int x^4\,{\left(d+e\,x^r\right)}^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^4*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int(x^4*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.386 $\int x^2(d+ex^r)^2\,(a+b\log(cx^n))\,dx$

3.386.1 Optimal result

Integrand size = 23, antiderivative size = 105

$$\int x^2(d+ex^r)^2\,(a+b\log(cx^n))\,dx=-\frac{1}{9}bd^2nx^3-\frac{2bdenx^{3+r}}{(3+r)^2}-\frac{be^2nx^{3+2r}}{(3+2r)^2}+\frac{1}{3}\left(d^2x^3+\frac{6dex^{3+r}}{3+r}+\frac{3e^2x^{3+2r}}{3+2r}\right)(a+b\log(cx^n))$$

output
```
-1/9*b*d^2*n*x^3-2*b*d*e*n*x^(3+r)/(3+r)^2-b*e^2*n*x^(3+2*r)/(3+2*r)^2+1/3
*(d^2*x^3+6*d*e*x^(3+r)/(3+r)+3*e^2*x^(3+2*r)/(3+2*r))*(a+b*ln(c*x^n))
```

3.386.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.18

$$\int x^2(d+ex^r)^2\,(a+b\log(cx^n))\,dx=\frac{1}{9}x^3\left(bn\left(-d^2-\frac{18dex^r}{(3+r)^2}-\frac{9e^2x^{2r}}{(3+2r)^2}\right)+3a\left(d^2+\frac{6dex^r}{3+r}+\frac{3e^2x^{2r}}{3+2r}\right)+3b\left(d^2+\frac{6dex^r}{3+r}+\frac{3e^2x^{2r}}{3+2r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^2*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
(x^3*(b*n*(-d^2 - (18*d*e*x^r)/(3 + r)^2 - (9*e^2*x^(2*r))/(3 + 2*r)^2) +
3*a*(d^2 + (6*d*e*x^r)/(3 + r) + (3*e^2*x^(2*r))/(3 + 2*r)) + 3*b*(d^2 + (
6*d*e*x^r)/(3 + r) + (3*e^2*x^(2*r))/(3 + 2*r))*Log[c*x^n]))/9
```

3.386.3 Rubi [A] (verified)

Time = 0.38 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2771, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex^r)^2(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{3}\left(d^2x^3+\frac{6dex^{r+3}}{r+3}+\frac{3e^2x^{2r+3}}{2r+3}\right)(a+b\log(cx^n))-bn\int\frac{1}{3}x^2\left(\frac{6dex^r}{r+3}+\frac{3e^2x^{2r}}{2r+3}+d^2\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}\left(d^2x^3+\frac{6dex^{r+3}}{r+3}+\frac{3e^2x^{2r+3}}{2r+3}\right)(a+b\log(cx^n))-\frac{1}{3}bn\int x^2\left(\frac{6dex^r}{r+3}+\frac{3e^2x^{2r}}{2r+3}+d^2\right)dx$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{3}\left(d^2x^3+\frac{6dex^{r+3}}{r+3}+\frac{3e^2x^{2r+3}}{2r+3}\right)(a+b\log(cx^n))-\frac{1}{3}bn\int\left(\frac{3e^2x^{2(r+1)}}{2r+3}+\frac{6dex^{r+2}}{r+3}+d^2x^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}\left(d^2x^3+\frac{6dex^{r+3}}{r+3}+\frac{3e^2x^{2r+3}}{2r+3}\right)(a+b\log(cx^n))-\frac{1}{3}bn\left(\frac{d^2x^3}{3}+\frac{6dex^{r+3}}{(r+3)^2}+\frac{3e^2x^{2r+3}}{(2r+3)^2}\right)$$

input
```
Int[x^2*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-1/3*(b*n*((d^2*x^3)/3 + (6*d*e*x^(3 + r))/(3 + r)^2 + (3*e^2*x^(3 + 2*r))
/(3 + 2*r)^2)) + ((d^2*x^3 + (6*d*e*x^(3 + r))/(3 + r) + (3*e^2*x^(3 + 2*r
))/(3 + 2*r))*(a + b*Log[c*x^n]))/3
```

3.386.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.386.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 580 vs. $2(101) = 202$.

Time = 3.03 (sec) , antiderivative size = 581, normalized size of antiderivative = 5.53

method	result
parallelrisch	$-\frac{-72x^3x^r\ln(c\,x^n)bde\,r^3-432x^3x^r\ln(c\,x^n)bde\,r^2-810x^3x^r\ln(c\,x^n)bder-72x^3x^r ade\,r^3-432x^3x^r ade\,r^2-810x^3x^r ader+72x}{}$
risch	Expression too large to display

input
```
int(x^2*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/9*(-135*x^3*(x^r)^2*ln(c*x^n)*b*e^2*r^2-72*x^3*x^r*ln(c*x^n)*b*d*e*r^3-
432*x^3*x^r*ln(c*x^n)*b*d*e*r^2-810*x^3*x^r*ln(c*x^n)*b*d*e*r-324*x^3*(x^r
)^2*a*e^2*r-324*x^3*(x^r)^2*ln(c*x^n)*b*e^2*r-72*x^3*x^r*a*d*e*r^3-432*x^3
*x^r*a*d*e*r^2-810*x^3*x^r*a*d*e*r+72*x^3*x^r*b*d*e*n*r^2+216*x^3*x^r*b*d*
e*n*r-486*x^3*d*e*x^r*b*ln(c*x^n)-243*x^3*e^2*(x^r)^2*a-243*x^3*b*ln(c*x^n
)*d^2-135*x^3*(x^r)^2*a*e^2*r^2-108*x^3*a*d^2*r^3-351*x^3*a*d^2*r^2-486*x^
3*a*d^2*r+162*x^3*x^r*b*d*e*n+9*x^3*(x^r)^2*b*e^2*n*r^2+54*x^3*(x^r)^2*b*e
^2*n*r-12*x^3*ln(c*x^n)*b*d^2*r^4-108*x^3*ln(c*x^n)*b*d^2*r^3-243*x^3*e^2*
(x^r)^2*b*ln(c*x^n)-243*a*d^2*x^3-486*x^3*ln(c*x^n)*b*d^2*r-18*x^3*(x^r)^2
*a*e^2*r^3-486*x^3*d*e*x^r*a-18*x^3*(x^r)^2*ln(c*x^n)*b*e^2*r^3-351*x^3*ln
(c*x^n)*b*d^2*r^2-12*x^3*a*d^2*r^4+81*b*d^2*n*x^3+81*x^3*(x^r)^2*b*e^2*n+4
*x^3*b*d^2*n*r^4+36*x^3*b*d^2*n*r^3+117*x^3*b*d^2*n*r^2+162*x^3*b*d^2*n*r)
/(3+2*r)^2/(3+r)^2
```

3.386.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 497 vs. $2(101) = 202$.

Time = 0.28 (sec) , antiderivative size = 497, normalized size of antiderivative = 4.73

$$\int x^2(d+ex^r)^2(a+b\log(cx^n))\,dx$$
$$= \frac{3\,(4\,bd^2r^4+36\,bd^2r^3+117\,bd^2r^2+162\,bd^2r+81\,bd^2)x^3\log(c)+3\,(4\,bd^2nr^4+36\,bd^2nr^3+117\,bd^2nr^2+}{}$$

input
```
integrate(x^2*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/9*(3*(4*b*d^2*r^4 + 36*b*d^2*r^3 + 117*b*d^2*r^2 + 162*b*d^2*r + 81*b*d^
2)*x^3*log(c) + 3*(4*b*d^2*n*r^4 + 36*b*d^2*n*r^3 + 117*b*d^2*n*r^2 + 162*
b*d^2*n*r + 81*b*d^2*n)*x^3*log(x) - (4*(b*d^2*n - 3*a*d^2)*r^4 + 81*b*d^2
*n + 36*(b*d^2*n - 3*a*d^2)*r^3 - 243*a*d^2 + 117*(b*d^2*n - 3*a*d^2)*r^2
+ 162*(b*d^2*n - 3*a*d^2)*r)*x^3 + 9*((2*b*e^2*r^3 + 15*b*e^2*r^2 + 36*b*e
^2*r + 27*b*e^2)*x^3*log(c) + (2*b*e^2*n*r^3 + 15*b*e^2*n*r^2 + 36*b*e^2*n
*r + 27*b*e^2*n)*x^3*log(x) + (2*a*e^2*r^3 - 9*b*e^2*n + 27*a*e^2 - (b*e^2
*n - 15*a*e^2)*r^2 - 6*(b*e^2*n - 6*a*e^2)*r)*x^3)*x^(2*r) + 18*((4*b*d*e*
r^3 + 24*b*d*e*r^2 + 45*b*d*e*r + 27*b*d*e)*x^3*log(c) + (4*b*d*e*n*r^3 +
24*b*d*e*n*r^2 + 45*b*d*e*n*r + 27*b*d*e*n)*x^3*log(x) + (4*a*d*e*r^3 - 9*
b*d*e*n + 27*a*d*e - 4*(b*d*e*n - 6*a*d*e)*r^2 - 3*(4*b*d*e*n - 15*a*d*e)*
r)*x^3)*x^r)/(4*r^4 + 36*r^3 + 117*r^2 + 162*r + 81)
```

3.386.6 Sympy [A] (verification not implemented)

Time = 83.39 (sec) , antiderivative size = 240, normalized size of antiderivative = 2.29

$$\int x^2(d+ex^r)^2\,(a+b\log{(cx^n)})\;dx$$
$$= \frac{ad^2x^3}{3} + 2ade\left(\begin{cases}\frac{x^3x^r}{r+3} & \text{for}\; r\neq -3\\ x^3x^r\log{(x)} & \text{otherwise}\end{cases}\right) + ae^2\left(\begin{cases}\frac{x^3x^{2r}}{2r+3} & \text{for}\; r\neq -\frac{3}{2}\\ x^3x^{2r}\log{(x)} & \text{otherwise}\end{cases}\right) - \frac{bd^2nx^3}{9} + \frac{bd^2x^3\log{(cx^n)}}{3} - 2bden\left(\begin{cases}\frac{\begin{cases}\frac{x^{r+3}}{r+3} & \text{for}\; r\neq -3\\ \log{(x)} & \text{otherwise}\end{cases}}{r+3} & \text{for}\; r>-\infty\wedge r<\infty\wedge r\neq -3\\ \frac{\log{(x)}^2}{2} & \text{otherwise}\end{cases}\right) + 2bde\left(\begin{cases}\frac{x^{r+3}}{r+3} & \text{for}\; r\neq -3\\ \log{(x)} & \text{otherwise}\end{cases}\right)\log{(cx^n)} - be^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r+3}}{2r+3} & \text{for}\; r\neq -\frac{3}{2}\\ \log{(x)} & \text{otherwise}\end{cases}}{2r+3} & \text{for}\; r>-\infty\wedge r<\infty\wedge r\neq -\frac{3}{2}\\ \frac{\log{(x)}^2}{2} & \text{otherwise}\end{cases}\right) + be^2\left(\begin{cases}\frac{x^{2r+3}}{2r+3} & \text{for}\; r\neq -\frac{3}{2}\\ \log{(x)} & \text{otherwise}\end{cases}\right)\log{(cx^n)}$$

input
```
integrate(x**2*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x**3/3 + 2*a*d*e*Piecewise((x**3*x**r/(r + 3), Ne(r, -3)), (x**3*x*
*r*log(x), True)) + a*e**2*Piecewise((x**3*x**(2*r)/(2*r + 3), Ne(r, -3/2)
), (x**3*x**(2*r)*log(x), True)) - b*d**2*n*x**3/9 + b*d**2*x**3*log(c*x**
n)/3 - 2*b*d*e*n*Piecewise((Piecewise((x**(r + 3)/(r + 3), Ne(r, -3)), (lo
g(x), True))/(r + 3), (r > -oo) & (r < oo) & Ne(r, -3)), (log(x)**2/2, Tru
e)) + 2*b*d*e*Piecewise((x**(r + 3)/(r + 3), Ne(r, -3)), (log(x), True))*l
og(c*x**n) - b*e**2*n*Piecewise((Piecewise((x**(2*r + 3)/(2*r + 3), Ne(r,
-3/2)), (log(x), True))/(2*r + 3), (r > -oo) & (r < oo) & Ne(r, -3/2)), (l
og(x)**2/2, True)) + b*e**2*Piecewise((x**(2*r + 3)/(2*r + 3), Ne(r, -3/2)
), (log(x), True))*log(c*x**n)
```

3.386.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 152, normalized size of antiderivative = 1.45

$$\int x^2(d+ex^r)^2 (a+b\log(cx^n))\,dx = -\frac{1}{9}\,bd^2nx^3+\frac{1}{3}\,bd^2x^3\log(cx^n)+\frac{1}{3}\,ad^2x^3 + \frac{be^2x^{2\,r+3}\log(cx^n)}{2\,r+3}+\frac{2\,bdex^{r+3}\log(cx^n)}{r+3} - \frac{be^2nx^{2\,r+3}}{(2\,r+3)^2}+\frac{ae^2x^{2\,r+3}}{2\,r+3}-\frac{2\,bdenx^{r+3}}{(r+3)^2}+\frac{2\,adex^{r+3}}{r+3}$$

input
```
integrate(x^2*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/9*b*d^2*n*x^3 + 1/3*b*d^2*x^3*log(c*x^n) + 1/3*a*d^2*x^3 + b*e^2*x^(2*r
 + 3)*log(c*x^n)/(2*r + 3) + 2*b*d*e*x^(r + 3)*log(c*x^n)/(r + 3) - b*e^2*
n*x^(2*r + 3)/(2*r + 3)^2 + a*e^2*x^(2*r + 3)/(2*r + 3) - 2*b*d*e*n*x^(r +
 3)/(r + 3)^2 + 2*a*d*e*x^(r + 3)/(r + 3)
```

3.386.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 746 vs. 2(101) = 202.

Time = 0.37 (sec) , antiderivative size = 746, normalized size of antiderivative = 7.10

$$\int x^2(d+ex^r)^2 (a+b\log(cx^n))\,dx = \frac{18\,be^2nr^3x^3x^{2\,r}\log(x)+72\,bdenr^3x^3x^r\log(x)+12\,bd^2nr^4x^3\log(x)-4\,bd^2nr^4x^3+18\,be^2r^3x^3x^{2\,r}\log(c)}{}$$

input
```
integrate(x^2*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/9*(18*b*e^2*n*r^3*x^3*x^(2*r)*log(x) + 72*b*d*e*n*r^3*x^3*x^r*log(x) + 1
2*b*d^2*n*r^4*x^3*log(x) - 4*b*d^2*n*r^4*x^3 + 18*b*e^2*r^3*x^3*x^(2*r)*lo
g(c) + 72*b*d*e*r^3*x^3*x^r*log(c) + 12*b*d^2*r^4*x^3*log(c) + 135*b*e^2*n
*r^2*x^3*x^(2*r)*log(x) + 432*b*d*e*n*r^2*x^3*x^r*log(x) + 108*b*d^2*n*r^3
*x^3*log(x) - 9*b*e^2*n*r^2*x^3*x^(2*r) + 18*a*e^2*r^3*x^3*x^(2*r) - 72*b*
d*e*n*r^2*x^3*x^r + 72*a*d*e*r^3*x^3*x^r - 36*b*d^2*n*r^3*x^3 + 12*a*d^2*r
^4*x^3 + 135*b*e^2*r^2*x^3*x^(2*r)*log(c) + 432*b*d*e*r^2*x^3*x^r*log(c) +
 108*b*d^2*r^3*x^3*log(c) + 324*b*e^2*n*r*x^3*x^(2*r)*log(x) + 810*b*d*e*n
*r*x^3*x^r*log(x) + 351*b*d^2*n*r^2*x^3*log(x) - 54*b*e^2*n*r*x^3*x^(2*r)
+ 135*a*e^2*r^2*x^3*x^(2*r) - 216*b*d*e*n*r*x^3*x^r + 432*a*d*e*r^2*x^3*x^
r - 117*b*d^2*n*r^2*x^3 + 108*a*d^2*r^3*x^3 + 324*b*e^2*r*x^3*x^(2*r)*log(
c) + 810*b*d*e*r*x^3*x^r*log(c) + 351*b*d^2*r^2*x^3*log(c) + 243*b*e^2*n*x
^3*x^(2*r)*log(x) + 486*b*d*e*n*x^3*x^r*log(x) + 486*b*d^2*n*r*x^3*log(x)
- 81*b*e^2*n*x^3*x^(2*r) + 324*a*e^2*r*x^3*x^(2*r) - 162*b*d*e*n*x^3*x^r +
 810*a*d*e*r*x^3*x^r - 162*b*d^2*n*r*x^3 + 351*a*d^2*r^2*x^3 + 243*b*e^2*x
^3*x^(2*r)*log(c) + 486*b*d*e*x^3*x^r*log(c) + 486*b*d^2*r*x^3*log(c) + 24
3*b*d^2*n*x^3*log(x) + 243*a*e^2*x^3*x^(2*r) + 486*a*d*e*x^3*x^r - 81*b*d^
2*n*x^3 + 486*a*d^2*r*x^3 + 243*b*d^2*x^3*log(c) + 243*a*d^2*x^3)/(4*r^4 +
 36*r^3 + 117*r^2 + 162*r + 81)
```

3.386.9 Mupad [F(-1)]

Timed out.

$$\int x^2(d+ex^r)^2\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^2\,\left(d+e\,x^r\right)^2\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^2*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int(x^2*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.387 $\int (d+ex^r)^2 (a+b\log(cx^n))\,dx$

3.387.1 Optimal result

Integrand size = 20, antiderivative size = 113

$$\int (d+ex^r)^2 (a+b\log(cx^n))\,dx = -bd^2nx - \frac{2bdenx^{1+r}}{(1+r)^2} - \frac{be^2nx^{1+2r}}{(1+2r)^2} + d^2x(a+b\log(cx^n)) + \frac{2dex^{1+r}(a+b\log(cx^n))}{1+r} + \frac{e^2x^{1+2r}(a+b\log(cx^n))}{1+2r}$$

output
```
-b*d^2*n*x-2*b*d*e*n*x^(1+r)/(1+r)^2-b*e^2*n*x^(1+2*r)/(1+2*r)^2+d^2*x*(a+
b*ln(c*x^n))+2*d*e*x^(1+r)*(a+b*ln(c*x^n))/(1+r)+e^2*x^(1+2*r)*(a+b*ln(c*x
^n))/(1+2*r)
```

3.387.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 107, normalized size of antiderivative = 0.95

$$\int (d+ex^r)^2 (a+b\log(cx^n))\,dx = x\left(ad^2 - bd^2n - \frac{2bdenx^r}{(1+r)^2} - \frac{be^2nx^{2r}}{(1+2r)^2} + bd^2\log(cx^n) + \frac{2dex^r(a+b\log(cx^n))}{1+r} + \frac{e^2x^{2r}(a+b\log(cx^n))}{1+2r}\right)$$

input
```
Integrate[(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
x*(a*d^2 - b*d^2*n - (2*b*d*e*n*x^r)/(1 + r)^2 - (b*e^2*n*x^(2*r))/(1 + 2*
r)^2 + b*d^2*Log[c*x^n] + (2*d*e*x^r*(a + b*Log[c*x^n]))/(1 + r) + (e^2*x^
(2*r)*(a + b*Log[c*x^n]))/(1 + 2*r))
```

3.387.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 110, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2750, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^r)^2 (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \text{2750}$$

$$-bn\int \left(\frac{2dex^r}{r+1}+\frac{e^2x^{2r}}{2r+1}+d^2\right)dx+d^2x(a+b\log(cx^n))+\frac{2dex^{r+1}(a+b\log(cx^n))}{r+1}+\frac{e^2x^{2r+1}(a+b\log(cx^n))}{2r+1}$$

$$\Big\downarrow \text{2009}$$

$$d^2x(a+b\log(cx^n))+\frac{2dex^{r+1}(a+b\log(cx^n))}{r+1}+\frac{e^2x^{2r+1}(a+b\log(cx^n))}{2r+1}-bn\left(d^2x+\frac{2dex^{r+1}}{(r+1)^2}+\frac{e^2x^{2r+1}}{(2r+1)^2}\right)$$

input
```
Int[(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*(d^2*x + (2*d*e*x^(1 + r))/(1 + r)^2 + (e^2*x^(1 + 2*r))/(1 + 2*r)^2
)) + d^2*x*(a + b*Log[c*x^n]) + (2*d*e*x^(1 + r)*(a + b*Log[c*x^n]))/(1 +
r) + (e^2*x^(1 + 2*r)*(a + b*Log[c*x^n]))/(1 + 2*r)
```

3.387.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

3.387.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 508 vs. $2(113) = 226$.

Time = 1.01 (sec) , antiderivative size = 509, normalized size of antiderivative = 4.50

method	result
parallelrisch	$-\frac{-8x\,x^{r} \ln(c\,x^{n})bde\,r^{3}-16x\,x^{r} \ln(c\,x^{n})bde\,r^{2}-8x\,x^{r} r^{3} ade-4x \ln(c\,x^{n})b\,d^{2} r^{4}+2x\,x^{r} bden-12x \ln(c\,x^{n})b\,d^{2} r^{3}-2xde\,x^{r} b \ln(c}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-8*x*x^r*ln(c*x^n)*b*d*e*r^3-16*x*x^r*ln(c*x^n)*b*d*e*r^2-4*x*(x^r)^2*ln
(c*x^n)*b*e^2*r-8*x*x^r*r^3*a*d*e-4*x*(x^r)^2*a*e^2*r-4*x*ln(c*x^n)*b*d^2*
r^4+x*(x^r)^2*b*e^2*n*r^2+2*x*(x^r)^2*b*e^2*n*r+2*x*x^r*b*d*e*n-12*x*ln(c*
x^n)*b*d^2*r^3-2*x*d*e*x^r*b*ln(c*x^n)-x*b*ln(c*x^n)*d^2-x*e^2*(x^r)^2*a-1
0*x*x^r*ln(c*x^n)*b*d*e*r-2*x*(x^r)^2*ln(c*x^n)*b*e^2*r^3-5*x*(x^r)^2*ln(c
*x^n)*b*e^2*r^2-x*e^2*(x^r)^2*b*ln(c*x^n)-6*x*ln(c*x^n)*b*d^2*r+12*x*b*d^2
*n*r^3+x*(x^r)^2*b*e^2*n+13*x*b*d^2*n*r^2+6*x*b*d^2*n*r+4*x*b*d^2*n*r^4+8*
x*x^r*b*d*e*n*r^2+8*x*x^r*b*d*e*n*r-a*d^2*x-2*x*d*e*x^r*a-2*x*(x^r)^2*a*e^
2*r^3-13*x*ln(c*x^n)*b*d^2*r^2-4*x*a*d^2*r^4-12*x*a*d^2*r^3-13*x*a*d^2*r^2
-6*x*a*d^2*r-5*x*(x^r)^2*a*e^2*r^2-10*x*x^r*r*a*d*e-16*x*x^r*a*d*e*r^2+b*d
^2*n*x)/(1+2*r)^2/(r^2+2*r+1)
```

3.387.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 466 vs. $2(113) = 226$.

Time = 0.32 (sec) , antiderivative size = 466, normalized size of antiderivative = 4.12

$$\int (d+ex^r)^2 (a+b\log(cx^n))\,dx$$
$$= \frac{(4\,bd^2r^4 + 12\,bd^2r^3 + 13\,bd^2r^2 + 6\,bd^2r + bd^2)x\log(c) + (4\,bd^2nr^4 + 12\,bd^2nr^3 + 13\,bd^2nr^2 + 6\,bd^2nr + bd}{}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((4*b*d^2*r^4 + 12*b*d^2*r^3 + 13*b*d^2*r^2 + 6*b*d^2*r + b*d^2)*x*log(c)
+ (4*b*d^2*n*r^4 + 12*b*d^2*n*r^3 + 13*b*d^2*n*r^2 + 6*b*d^2*n*r + b*d^2*n
)*x*log(x) - (4*(b*d^2*n - a*d^2)*r^4 + b*d^2*n + 12*(b*d^2*n - a*d^2)*r^3
 - a*d^2 + 13*(b*d^2*n - a*d^2)*r^2 + 6*(b*d^2*n - a*d^2)*r)*x + ((2*b*e^2
*r^3 + 5*b*e^2*r^2 + 4*b*e^2*r + b*e^2)*x*log(c) + (2*b*e^2*n*r^3 + 5*b*e^
2*n*r^2 + 4*b*e^2*n*r + b*e^2*n)*x*log(x) + (2*a*e^2*r^3 - b*e^2*n + a*e^2
 - (b*e^2*n - 5*a*e^2)*r^2 - 2*(b*e^2*n - 2*a*e^2)*r)*x)*x^(2*r) + 2*((4*b
*d*e*r^3 + 8*b*d*e*r^2 + 5*b*d*e*r + b*d*e)*x*log(c) + (4*b*d*e*n*r^3 + 8*
b*d*e*n*r^2 + 5*b*d*e*n*r + b*d*e*n)*x*log(x) + (4*a*d*e*r^3 - b*d*e*n + a
*d*e - 4*(b*d*e*n - 2*a*d*e)*r^2 - (4*b*d*e*n - 5*a*d*e)*r)*x)*x^r)/(4*r^4
 + 12*r^3 + 13*r^2 + 6*r + 1)
```

3.387.6 Sympy [A] (verification not implemented)

Time = 2.28 (sec) , antiderivative size = 211, normalized size of antiderivative = 1.87

$$\begin{aligned}\int (d+ex^r)^2(a+b\log(cx^n))\,dx &= ad^2x + 2ade\left(\begin{cases}\frac{x^{r+1}}{r+1} & \text{for } r\neq -1\\ \log(x) & \text{otherwise}\end{cases}\right) + ae^2\left(\begin{cases}\frac{x^{2r+1}}{2r+1} & \text{for } r\neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}\right) - bd^2nx \\ &\quad + bd^2x\log(cx^n) - 2bden\left(\begin{cases}\frac{\begin{cases}\frac{x^{r+1}}{r+1} & \text{for } r\neq -1\\ \log(x) & \text{otherwise}\end{cases}}{r+1} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq -1\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) \\ &\quad + 2bde\left(\begin{cases}\frac{x^{r+1}}{r+1} & \text{for } r\neq -1\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n) \\ &\quad - be^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r+1}}{2r+1} & \text{for } r\neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r+1} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq -\frac{1}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right) \\ &\quad + be^2\left(\begin{cases}\frac{x^{2r+1}}{2r+1} & \text{for } r\neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)\end{aligned}$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
a*d**2*x + 2*a*d*e*Piecewise((x**(r + 1)/(r + 1), Ne(r, -1)), (log(x), Tru
e)) + a*e**2*Piecewise((x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(x), Tru
e)) - b*d**2*n*x + b*d**2*x*log(c*x**n) - 2*b*d*e*n*Piecewise((Piecewise((
x**(r + 1)/(r + 1), Ne(r, -1)), (log(x), True))/(r + 1), (r > -oo) & (r <
oo) & Ne(r, -1)), (log(x)**2/2, True)) + 2*b*d*e*Piecewise((x**(r + 1)/(r
+ 1), Ne(r, -1)), (log(x), True))*log(c*x**n) - b*e**2*n*Piecewise((Piecew
ise((x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(x), True))/(2*r + 1), (r >
 -oo) & (r < oo) & Ne(r, -1/2)), (log(x)**2/2, True)) + b*e**2*Piecewise((
x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(x), True))*log(c*x**n)
```

3.387.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 144, normalized size of antiderivative = 1.27

$$\int (d+ex^r)^2 (a+b\log(cx^n))\, dx = -bd^2nx + bd^2x\log(cx^n) + ad^2x + \frac{be^2x^{2r+1}\log(cx^n)}{2r+1} + \frac{2bdex^{r+1}\log(cx^n)}{r+1} - \frac{be^2nx^{2r+1}}{(2r+1)^2} + \frac{ae^2x^{2r+1}}{2r+1} - \frac{2bdenx^{r+1}}{(r+1)^2} + \frac{2adex^{r+1}}{r+1}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*d^2*n*x + b*d^2*x*log(c*x^n) + a*d^2*x + b*e^2*x^(2*r + 1)*log(c*x^n)/(
2*r + 1) + 2*b*d*e*x^(r + 1)*log(c*x^n)/(r + 1) - b*e^2*n*x^(2*r + 1)/(2*r
 + 1)^2 + a*e^2*x^(2*r + 1)/(2*r + 1) - 2*b*d*e*n*x^(r + 1)/(r + 1)^2 + 2*
a*d*e*x^(r + 1)/(r + 1)
```

3.387.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 244 vs. $2(113) = 226$.

Time = 0.34 (sec) , antiderivative size = 244, normalized size of antiderivative = 2.16

$$\int (d+ex^r)^2 (a+b\log(cx^n))\,dx = \frac{2\,be^2nrxx^{2\,r}\log(x)}{4\,r^2+4\,r+1} + \frac{2\,bdenrxx^r\log(x)}{r^2+2\,r+1} + bd^2nx\log(x) + \frac{be^2nxx^{2\,r}\log(x)}{4\,r^2+4\,r+1} + \frac{2\,bdenxx^r\log(x)}{r^2+2\,r+1} - bd^2nx - \frac{be^2nxx^{2\,r}}{4\,r^2+4\,r+1} - \frac{2\,bdenxx^r}{r^2+2\,r+1} + bd^2x\log(c) + \frac{be^2xx^{2\,r}\log(c)}{2\,r+1} + \frac{2\,bdexx^r\log(c)}{r+1} + ad^2x + \frac{ae^2xx^{2\,r}}{2\,r+1} + \frac{2\,adexx^r}{r+1}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
2*b*e^2*n*r*x*x^(2*r)*log(x)/(4*r^2 + 4*r + 1) + 2*b*d*e*n*r*x*x^r*log(x)/
(r^2 + 2*r + 1) + b*d^2*n*x*log(x) + b*e^2*n*x*x^(2*r)*log(x)/(4*r^2 + 4*r
 + 1) + 2*b*d*e*n*x*x^r*log(x)/(r^2 + 2*r + 1) - b*d^2*n*x - b*e^2*n*x*x^(
2*r)/(4*r^2 + 4*r + 1) - 2*b*d*e*n*x*x^r/(r^2 + 2*r + 1) + b*d^2*x*log(c)
+ b*e^2*x*x^(2*r)*log(c)/(2*r + 1) + 2*b*d*e*x*x^r*log(c)/(r + 1) + a*d^2*
x + a*e^2*x*x^(2*r)/(2*r + 1) + 2*a*d*e*x*x^r/(r + 1)
```

3.387.9 Mupad [F(-1)]

Timed out.

$$\int (d+ex^r)^2 (a+b\log(cx^n))\,dx = \int (d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int((d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.388 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^2}\,dx$

3.388.1 Optimal result

Integrand size = 23, antiderivative size = 123

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^2}\,dx = -\frac{bd^2n}{x}-\frac{2bdenx^{-1+r}}{(1-r)^2}-\frac{be^2nx^{-1+2r}}{(1-2r)^2}-\frac{d^2(a+b\log(cx^n))}{x}-\frac{2dex^{-1+r}(a+b\log(cx^n))}{1-r}-\frac{e^2x^{-1+2r}(a+b\log(cx^n))}{1-2r}$$

output
```
-b*d^2*n/x-2*b*d*e*n*x^(-1+r)/(1-r)^2-b*e^2*n*x^(-1+2*r)/(1-2*r)^2-d^2*(a+
b*ln(c*x^n))/x-2*d*e*x^(-1+r)*(a+b*ln(c*x^n))/(1-r)-e^2*x^(-1+2*r)*(a+b*ln
(c*x^n))/(1-2*r)
```

3.388.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 121, normalized size of antiderivative = 0.98

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^2}\,dx = \frac{bn\left(-d^2-\frac{2dex^r}{(-1+r)^2}-\frac{e^2x^{2r}}{(1-2r)^2}\right)+a\left(-d^2+\frac{2dex^r}{-1+r}+\frac{e^2x^{2r}}{-1+2r}\right)+b\left(-d^2+\frac{2dex^r}{-1+r}+\frac{e^2x^{2r}}{-1+2r}\right)\log(cx^n)}{x}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
(b*n*(-d^2 - (2*d*e*x^r)/(-1 + r)^2 - (e^2*x^(2*r))/(1 - 2*r)^2) + a*(-d^2
 + (2*d*e*x^r)/(-1 + r) + (e^2*x^(2*r))/(-1 + 2*r)) + b*(-d^2 + (2*d*e*x^r
)/(-1 + r) + (e^2*x^(2*r))/(-1 + 2*r))*Log[c*x^n])/x
```

3.388.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 121, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 25, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^2}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{2dex^r}{1-r}+\frac{e^2x^{2r}}{1-2r}+d^2}{x^2}dx-\frac{d^2(a+b\log(cx^n))}{x}-\frac{2dex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{e^2x^{2r-1}(a+b\log(cx^n))}{1-2r}$$

$$\Big\downarrow \text{25}$$

$$bn\int \frac{\frac{2dex^r}{1-r}+\frac{e^2x^{2r}}{1-2r}+d^2}{x^2}dx-\frac{d^2(a+b\log(cx^n))}{x}-\frac{2dex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{e^2x^{2r-1}(a+b\log(cx^n))}{1-2r}$$

$$\Big\downarrow \text{1691}$$

$$bn\int \left(-\frac{2dex^{r-2}}{r-1}+\frac{e^2x^{2(r-1)}}{1-2r}+\frac{d^2}{x^2}\right)dx-\frac{d^2(a+b\log(cx^n))}{x}-\frac{2dex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{e^2x^{2r-1}(a+b\log(cx^n))}{1-2r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{x}-\frac{2dex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{e^2x^{2r-1}(a+b\log(cx^n))}{1-2r}+bn\left(-\frac{d^2}{x}-\frac{2dex^{r-1}}{(1-r)^2}-\frac{e^2x^{2r-1}}{(1-2r)^2}\right)$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
b*n*(-(d^2/x) - (2*d*e*x^(-1 + r))/(1 - r)^2 - (e^2*x^(-1 + 2*r))/(1 - 2*r
)^2) - (d^2*(a + b*Log[c*x^n]))/x - (2*d*e*x^(-1 + r)*(a + b*Log[c*x^n]))/
(1 - r) - (e^2*x^(-1 + 2*r)*(a + b*Log[c*x^n]))/(1 - 2*r)
```

3.388.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.388.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 470 vs. $2(123) = 246$.

Time = 1.11 (sec) , antiderivative size = 471, normalized size of antiderivative = 3.83

method	result
parallelrisch	$-\frac{b\ln(c\,x^n)d^2+2bden\,x^r+13b\,d^2n\,r^2+2de\,x^r a-6b\,d^2nr+2de\,x^r b\ln(c\,x^n)+4a\,d^2r^4-12a\,d^2r^3-8ade\,r^3x^r+b\,d^2n+a\,d^2+4\ln(c}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-1/x*(b*ln(c*x^n)*d^2-2*b*e^2*n*r*(x^r)^2+2*b*d*e*n*x^r+5*a*e^2*r^2*(x^r)^
2-4*a*e^2*r*(x^r)^2+b*e^2*n*(x^r)^2-2*a*e^2*r^3*(x^r)^2+e^2*(x^r)^2*a+13*b
*d^2*n*r^2+2*d*e*x^r*a+e^2*(x^r)^2*b*ln(c*x^n)-6*b*d^2*n*r+2*d*e*x^r*b*ln(
c*x^n)+4*a*d^2*r^4-12*a*d^2*r^3-8*a*d*e*r^3*x^r+b*d^2*n+a*d^2+4*ln(c*x^n)*
b*d^2*r^4-12*ln(c*x^n)*b*d^2*r^3+13*ln(c*x^n)*b*d^2*r^2-6*ln(c*x^n)*b*d^2*
r+4*b*d^2*n*r^4-12*b*d^2*n*r^3-8*b*d*e*n*r*x^r+13*a*d^2*r^2-6*a*d^2*r-2*(x
^r)^2*ln(c*x^n)*b*e^2*r^3+5*(x^r)^2*ln(c*x^n)*b*e^2*r^2-4*(x^r)^2*ln(c*x^n
)*b*e^2*r+8*b*d*e*n*r^2*x^r+16*a*d*e*r^2*x^r-10*a*d*e*r*x^r+b*e^2*n*r^2*(x
^r)^2-8*x^r*ln(c*x^n)*b*d*e*r^3+16*x^r*ln(c*x^n)*b*d*e*r^2-10*x^r*ln(c*x^n
)*b*d*e*r)/(-1+2*r)^2/(r^2-2*r+1)
```

3.388.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 455 vs. $2(118) = 236$.

Time = 0.32 (sec) , antiderivative size = 455, normalized size of antiderivative = 3.70

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^2}\,dx = -\frac{4\,(bd^2n+ad^2)r^4+bd^2n-12\,(bd^2n+ad^2)r^3+ad^2+13\,(bd^2n+ad^2)r^2-6\,(bd^2n+ad^2)r-(2\,ae^2r^3-$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
-(4*(b*d^2*n + a*d^2)*r^4 + b*d^2*n - 12*(b*d^2*n + a*d^2)*r^3 + a*d^2 + 1
3*(b*d^2*n + a*d^2)*r^2 - 6*(b*d^2*n + a*d^2)*r - (2*a*e^2*r^3 - b*e^2*n -
 a*e^2 - (b*e^2*n + 5*a*e^2)*r^2 + 2*(b*e^2*n + 2*a*e^2)*r + (2*b*e^2*r^3
- 5*b*e^2*r^2 + 4*b*e^2*r - b*e^2)*log(c) + (2*b*e^2*n*r^3 - 5*b*e^2*n*r^2
 + 4*b*e^2*n*r - b*e^2*n)*log(x))*x^(2*r) - 2*(4*a*d*e*r^3 - b*d*e*n - a*d
*e - 4*(b*d*e*n + 2*a*d*e)*r^2 + (4*b*d*e*n + 5*a*d*e)*r + (4*b*d*e*r^3 -
8*b*d*e*r^2 + 5*b*d*e*r - b*d*e)*log(c) + (4*b*d*e*n*r^3 - 8*b*d*e*n*r^2 +
 5*b*d*e*n*r - b*d*e*n)*log(x))*x^r + (4*b*d^2*r^4 - 12*b*d^2*r^3 + 13*b*d
^2*r^2 - 6*b*d^2*r + b*d^2)*log(c) + (4*b*d^2*n*r^4 - 12*b*d^2*n*r^3 + 13*
b*d^2*n*r^2 - 6*b*d^2*n*r + b*d^2*n)*log(x))/((4*r^4 - 12*r^3 + 13*r^2 - 6
*r + 1)*x)
```

3.388.6 Sympy [A] (verification not implemented)

Time = 3.29 (sec) , antiderivative size = 209, normalized size of antiderivative = 1.70

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^2}\,dx$$
$$= -\frac{ad^2}{x} + 2ade\left(\begin{cases}\frac{x^r}{rx-x} & \text{for } r\neq 1\\ \frac{x^r\log(x)}{x} & \text{otherwise}\end{cases}\right) + ae^2\left(\begin{cases}\frac{x^{2r}}{2rx-x} & \text{for } r\neq \frac{1}{2}\\ \frac{x^{2r}\log(x)}{x} & \text{otherwise}\end{cases}\right) - \frac{bd^2n}{x}$$
$$- \frac{bd^2\log(cx^n)}{x} - 2bden\left(\begin{cases}\frac{\begin{cases}\frac{x^{r-1}}{r-1} & \text{for } r\neq 1\\ \log(x) & \text{otherwise}\end{cases}}{r-1} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq 1\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 2bde\left(\begin{cases}\frac{x^{r-1}}{r-1} & \text{for } r\neq 1\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$
$$- be^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r-1}}{2r-1} & \text{for } r\neq \frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r-1} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq \frac{1}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ be^2\left(\begin{cases}\frac{x^{2r-1}}{2r-1} & \text{for } r\neq \frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**2,x)
```

output
```
-a*d**2/x + 2*a*d*e*Piecewise((x**r/(r*x - x), Ne(r, 1)), (x**r*log(x)/x,
True)) + a*e**2*Piecewise((x**(2*r)/(2*r*x - x), Ne(r, 1/2)), (x**(2*r)*lo
g(x)/x, True)) - b*d**2*n/x - b*d**2*log(c*x**n)/x - 2*b*d*e*n*Piecewise((
Piecewise((x**(r - 1)/(r - 1), Ne(r, 1)), (log(x), True))/(r - 1), (r > -o
o) & (r < oo) & Ne(r, 1)), (log(x)**2/2, True)) + 2*b*d*e*Piecewise((x**(r
 - 1)/(r - 1), Ne(r, 1)), (log(x), True))*log(c*x**n) - b*e**2*n*Piecewise
((Piecewise((x**(2*r - 1)/(2*r - 1), Ne(r, 1/2)), (log(x), True))/(2*r - 1
), (r > -oo) & (r < oo) & Ne(r, 1/2)), (log(x)**2/2, True)) + b*e**2*Piece
wise((x**(2*r - 1)/(2*r - 1), Ne(r, 1/2)), (log(x), True))*log(c*x**n)
```

3.388.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^2} \, dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-2>0)', see `assume?` for more
details)Is
```

3.388.8 Giac [F]

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^2} \, dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x^2} \, dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x^2, x)
```

3.388.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^2} \, dx = \int \frac{(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))}{x^2} \, dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^2,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^2, x)
```

3.389 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^4}\,dx$

3.389.1 Optimal result

Integrand size = 23, antiderivative size = 127

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^4}\,dx = -\frac{bd^2n}{9x^3}-\frac{2bdenx^{-3+r}}{(3-r)^2}-\frac{be^2nx^{-3+2r}}{(3-2r)^2}-\frac{d^2(a+b\log(cx^n))}{3x^3} - \frac{2dex^{-3+r}(a+b\log(cx^n))}{3-r}-\frac{e^2x^{-3+2r}(a+b\log(cx^n))}{3-2r}$$

output
```
-1/9*b*d^2*n/x^3-2*b*d*e*n*x^(-3+r)/(3-r)^2-b*e^2*n*x^(-3+2*r)/(3-2*r)^2-1
/3*d^2*(a+b*ln(c*x^n))/x^3-2*d*e*x^(-3+r)*(a+b*ln(c*x^n))/(3-r)-e^2*x^(-3+
2*r)*(a+b*ln(c*x^n))/(3-2*r)
```

3.389.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^4}\,dx = \frac{bn\left(-d^2-\frac{18dex^r}{(-3+r)^2}-\frac{9e^2x^{2r}}{(3-2r)^2}\right)+a\left(-3d^2+\frac{18dex^r}{-3+r}+\frac{9e^2x^{2r}}{-3+2r}\right)+3b\left(-d^2+\frac{6dex^r}{-3+r}+\frac{3e^2x^{2r}}{-3+2r}\right)\log(cx^n)}{9x^3}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-d^2 - (18*d*e*x^r)/(-3 + r)^2 - (9*e^2*x^(2*r))/(3 - 2*r)^2) + a*(-
3*d^2 + (18*d*e*x^r)/(-3 + r) + (9*e^2*x^(2*r))/(-3 + 2*r)) + 3*b*(-d^2 +
(6*d*e*x^r)/(-3 + r) + (3*e^2*x^(2*r))/(-3 + 2*r))*Log[c*x^n])/(9*x^3)
```

3.389.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 128, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^4}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{6dex^r}{3-r}+\frac{3e^2x^{2r}}{3-2r}+d^2}{3x^4}dx-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2dex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{e^2x^{2r-3}(a+b\log(cx^n))}{3-2r}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}bn\int \frac{\frac{6dex^r}{3-r}+\frac{3e^2x^{2r}}{3-2r}+d^2}{x^4}dx-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2dex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{e^2x^{2r-3}(a+b\log(cx^n))}{3-2r}$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{3}bn\int \left(-\frac{6dex^{r-4}}{r-3}+\frac{3e^2x^{2(r-2)}}{3-2r}+\frac{d^2}{x^4}\right)dx-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2dex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{e^2x^{2r-3}(a+b\log(cx^n))}{3-2r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{3x^3}-\frac{2dex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{e^2x^{2r-3}(a+b\log(cx^n))}{3-2r}+\frac{1}{3}bn\left(-\frac{d^2}{3x^3}-\frac{6dex^{r-3}}{(3-r)^2}-\frac{3e^2x^{2r-3}}{(3-2r)^2}\right)$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-1/3*d^2/x^3 - (6*d*e*x^(-3 + r))/(3 - r)^2 - (3*e^2*x^(-3 + 2*r))/(
3 - 2*r)^2))/3 - (d^2*(a + b*Log[c*x^n]))/(3*x^3) - (2*d*e*x^(-3 + r)*(a +
 b*Log[c*x^n]))/(3 - r) - (e^2*x^(-3 + 2*r)*(a + b*Log[c*x^n]))/(3 - 2*r)
```

3.389.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.389.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 477 vs. $2(123) = 246$.

Time = 1.12 (sec) , antiderivative size = 478, normalized size of antiderivative = 3.76

method	result
parallelrisch	$-\frac{243b\ln(c\,x^n)d^2+162bden\,x^r+117b\,d^2n\,r^2+486de\,x^r a-162b\,d^2nr+486de\,x^r b\ln(c\,x^n)+12a\,d^2r^4-108a\,d^2r^3-72ade\,r^3x^r+8}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/9/x^3*(243*b*ln(c*x^n)*d^2-54*b*e^2*n*r*(x^r)^2+162*b*d*e*n*x^r+135*a*e
^2*r^2*(x^r)^2-324*a*e^2*r*(x^r)^2+81*b*e^2*n*(x^r)^2-18*a*e^2*r^3*(x^r)^2
+243*e^2*(x^r)^2*a+117*b*d^2*n*r^2+486*d*e*x^r*a+243*e^2*(x^r)^2*b*ln(c*x^
n)-162*b*d^2*n*r+486*d*e*x^r*b*ln(c*x^n)+12*a*d^2*r^4-108*a*d^2*r^3-72*a*d
*e*r^3*x^r+81*b*d^2*n+243*a*d^2+12*ln(c*x^n)*b*d^2*r^4-108*ln(c*x^n)*b*d^2
*r^3+351*ln(c*x^n)*b*d^2*r^2-486*ln(c*x^n)*b*d^2*r+4*b*d^2*n*r^4-36*b*d^2*
n*r^3-216*b*d*e*n*r*x^r+351*a*d^2*r^2-486*a*d^2*r-18*(x^r)^2*ln(c*x^n)*b*e
^2*r^3+135*(x^r)^2*ln(c*x^n)*b*e^2*r^2-324*(x^r)^2*ln(c*x^n)*b*e^2*r+72*b*
d*e*n*r^2*x^r+432*a*d*e*r^2*x^r-810*a*d*e*r*x^r+9*b*e^2*n*r^2*(x^r)^2-72*x
^r*ln(c*x^n)*b*d*e*r^3+432*x^r*ln(c*x^n)*b*d*e*r^2-810*x^r*ln(c*x^n)*b*d*e
*r)/(-3+2*r)^2/(r^2-6*r+9)
```

3.389.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 466 vs. $2(118) = 236$.

Time = 0.30 (sec) , antiderivative size = 466, normalized size of antiderivative = 3.67

$$\int \frac{(d+ex^r)^2\,(a+b\log{(cx^n)})}{x^4}\,dx = -\frac{4\,(bd^2n+3\,ad^2)r^4+81\,bd^2n-36\,(bd^2n+3\,ad^2)r^3+243\,ad^2+117\,(bd^2n+3\,ad^2)r^2-162\,(bd^2n+3\,a\cdots}{\cdots}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/9*(4*(b*d^2*n + 3*a*d^2)*r^4 + 81*b*d^2*n - 36*(b*d^2*n + 3*a*d^2)*r^3
+ 243*a*d^2 + 117*(b*d^2*n + 3*a*d^2)*r^2 - 162*(b*d^2*n + 3*a*d^2)*r - 9*
(2*a*e^2*r^3 - 9*b*e^2*n - 27*a*e^2 - (b*e^2*n + 15*a*e^2)*r^2 + 6*(b*e^2*
n + 6*a*e^2)*r + (2*b*e^2*r^3 - 15*b*e^2*r^2 + 36*b*e^2*r - 27*b*e^2)*log(
c) + (2*b*e^2*n*r^3 - 15*b*e^2*n*r^2 + 36*b*e^2*n*r - 27*b*e^2*n)*log(x))*
x^(2*r) - 18*(4*a*d*e*r^3 - 9*b*d*e*n - 27*a*d*e - 4*(b*d*e*n + 6*a*d*e)*r
^2 + 3*(4*b*d*e*n + 15*a*d*e)*r + (4*b*d*e*r^3 - 24*b*d*e*r^2 + 45*b*d*e*r
 - 27*b*d*e)*log(c) + (4*b*d*e*n*r^3 - 24*b*d*e*n*r^2 + 45*b*d*e*n*r - 27*
b*d*e*n)*log(x))*x^r + 3*(4*b*d^2*r^4 - 36*b*d^2*r^3 + 117*b*d^2*r^2 - 162
*b*d^2*r + 81*b*d^2)*log(c) + 3*(4*b*d^2*n*r^4 - 36*b*d^2*n*r^3 + 117*b*d^
2*n*r^2 - 162*b*d^2*n*r + 81*b*d^2*n)*log(x))/((4*r^4 - 36*r^3 + 117*r^2 -
 162*r + 81)*x^3)
```

3.389.6 Sympy [A] (verification not implemented)

Time = 18.04 (sec) , antiderivative size = 233, normalized size of antiderivative = 1.83

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^4}\,dx$$
$$= -\frac{ad^2}{3x^3} + 2ade\left(\begin{cases}\frac{x^r}{rx^3-3x^3} & \text{for } r\neq 3\\ \frac{x^r\log(x)}{x^3} & \text{otherwise}\end{cases}\right) + ae^2\left(\begin{cases}\frac{x^{2r}}{2rx^3-3x^3} & \text{for } r\neq \frac{3}{2}\\ \frac{x^{2r}\log(x)}{x^3} & \text{otherwise}\end{cases}\right) - \frac{bd^2n}{9x^3}$$
$$- \frac{bd^2\log(cx^n)}{3x^3} - 2bden\left(\begin{cases}\frac{\begin{cases}\frac{x^{r-3}}{r-3} & \text{for } r\neq 3\\ \log(x) & \text{otherwise}\end{cases}}{r-3} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq 3\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 2bde\left(\begin{cases}\frac{x^{r-3}}{r-3} & \text{for } r\neq 3\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$
$$- be^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r-3}}{2r-3} & \text{for } r\neq \frac{3}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r-3} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq \frac{3}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ be^2\left(\begin{cases}\frac{x^{2r-3}}{2r-3} & \text{for } r\neq \frac{3}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d**2/(3*x**3) + 2*a*d*e*Piecewise((x**r/(r*x**3 - 3*x**3), Ne(r, 3)), (
x**r*log(x)/x**3, True)) + a*e**2*Piecewise((x**(2*r)/(2*r*x**3 - 3*x**3),
 Ne(r, 3/2)), (x**(2*r)*log(x)/x**3, True)) - b*d**2*n/(9*x**3) - b*d**2*l
og(c*x**n)/(3*x**3) - 2*b*d*e*n*Piecewise((Piecewise((x**(r - 3)/(r - 3),
Ne(r, 3)), (log(x), True))/(r - 3), (r > -oo) & (r < oo) & Ne(r, 3)), (log
(x)**2/2, True)) + 2*b*d*e*Piecewise((x**(r - 3)/(r - 3), Ne(r, 3)), (log(
x), True))*log(c*x**n) - b*e**2*n*Piecewise((Piecewise((x**(2*r - 3)/(2*r
- 3), Ne(r, 3/2)), (log(x), True))/(2*r - 3), (r > -oo) & (r < oo) & Ne(r,
 3/2)), (log(x)**2/2, True)) + b*e**2*Piecewise((x**(2*r - 3)/(2*r - 3), N
e(r, 3/2)), (log(x), True))*log(c*x**n)
```

3.389.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^4} dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-4>0)', see `assume?` for more
details)Is
```

3.389.8 Giac [F]

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^4} dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x^4} dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x^4, x)
```

3.389.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^4} dx = \int \frac{(d+e\,x^r)^2 (a+b\,\ln(c\,x^n))}{x^4} dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^4,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^4, x)
```

3.390 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^6}\,dx$

3.390.1 Optimal result

Integrand size = 23, antiderivative size = 127

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^6}\,dx = -\frac{bd^2n}{25x^5}-\frac{2bdenx^{-5+r}}{(5-r)^2}-\frac{be^2nx^{-5+2r}}{(5-2r)^2}-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2dex^{-5+r}(a+b\log(cx^n))}{5-r}-\frac{e^2x^{-5+2r}(a+b\log(cx^n))}{5-2r}$$

output
```
-1/25*b*d^2*n/x^5-2*b*d*e*n*x^(-5+r)/(5-r)^2-b*e^2*n*x^(-5+2*r)/(5-2*r)^2-
1/5*d^2*(a+b*ln(c*x^n))/x^5-2*d*e*x^(-5+r)*(a+b*ln(c*x^n))/(5-r)-e^2*x^(-5
+2*r)*(a+b*ln(c*x^n))/(5-2*r)
```

3.390.2 Mathematica [A] (verified)

Time = 0.20 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))}{x^6}\,dx = \frac{bn\left(-d^2-\frac{50dex^r}{(-5+r)^2}-\frac{25e^2x^{2r}}{(5-2r)^2}\right)+a\left(-5d^2+\frac{50dex^r}{-5+r}+\frac{25e^2x^{2r}}{-5+2r}\right)+5b\left(-d^2+\frac{10dex^r}{-5+r}+\frac{5e^2x^{2r}}{-5+2r}\right)\log(cx^n)}{25x^5}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*(-d^2 - (50*d*e*x^r)/(-5 + r)^2 - (25*e^2*x^(2*r))/(5 - 2*r)^2) + a*(
-5*d^2 + (50*d*e*x^r)/(-5 + r) + (25*e^2*x^(2*r))/(-5 + 2*r)) + 5*b*(-d^2
+ (10*d*e*x^r)/(-5 + r) + (5*e^2*x^(2*r))/(-5 + 2*r))*Log[c*x^n])/(25*x^5)
```

3.390.3 Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 128, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^6} dx$$

$$\Big\downarrow \; 2772$$

$$-bn\int -\frac{\frac{10dex^r}{5-r}+\frac{5e^2x^{2r}}{5-2r}+d^2}{5x^6}dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2dex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{e^2x^{2r-5}(a+b\log(cx^n))}{5-2r}$$

$$\Big\downarrow \; 27$$

$$\frac{1}{5}bn\int \frac{\frac{10dex^r}{5-r}+\frac{5e^2x^{2r}}{5-2r}+d^2}{x^6}dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2dex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{e^2x^{2r-5}(a+b\log(cx^n))}{5-2r}$$

$$\Big\downarrow \; 1691$$

$$\frac{1}{5}bn\int \left(-\frac{10dex^{r-6}}{r-5}+\frac{5e^2x^{2(r-3)}}{5-2r}+\frac{d^2}{x^6}\right)dx-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2dex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{e^2x^{2r-5}(a+b\log(cx^n))}{5-2r}$$

$$\Big\downarrow \; 2009$$

$$-\frac{d^2(a+b\log(cx^n))}{5x^5}-\frac{2dex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{e^2x^{2r-5}(a+b\log(cx^n))}{5-2r}+\frac{1}{5}bn\left(-\frac{d^2}{5x^5}-\frac{10dex^{r-5}}{(5-r)^2}-\frac{5e^2x^{2r-5}}{(5-2r)^2}\right)$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*(-1/5*d^2/x^5 - (10*d*e*x^(-5 + r))/(5 - r)^2 - (5*e^2*x^(-5 + 2*r))/
(5 - 2*r)^2))/5 - (d^2*(a + b*Log[c*x^n]))/(5*x^5) - (2*d*e*x^(-5 + r)*(a
+ b*Log[c*x^n]))/(5 - r) - (e^2*x^(-5 + 2*r)*(a + b*Log[c*x^n]))/(5 - 2*r)
```

3.390.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.390.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 477 vs. $2(123) = 246$.

Time = 1.10 (sec) , antiderivative size = 478, normalized size of antiderivative = 3.76

method	result
parallelrisch	$-\frac{3125b\ln(c\,x^n)d^2+1250bden\,x^r+325b\,d^2n\,r^2+6250de\,x^r a-750b\,d^2nr+6250de\,x^r b\ln(c\,x^n)+20a\,d^2r^4-300a\,d^2r^3-200ade\,r^3}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/25/x^5*(3125*b*ln(c*x^n)*d^2-250*b*e^2*n*r*(x^r)^2+1250*b*d*e*n*x^r+625
*a*e^2*r^2*(x^r)^2-2500*a*e^2*r*(x^r)^2+625*b*e^2*n*(x^r)^2-50*a*e^2*r^3*(
x^r)^2+3125*e^2*(x^r)^2*a+325*b*d^2*n*r^2+6250*d*e*x^r*a+3125*e^2*(x^r)^2*
b*ln(c*x^n)-750*b*d^2*n*r+6250*d*e*x^r*b*ln(c*x^n)+20*a*d^2*r^4-300*a*d^2*
r^3-200*a*d*e*r^3*x^r+625*b*d^2*n+3125*a*d^2+20*ln(c*x^n)*b*d^2*r^4-300*ln
(c*x^n)*b*d^2*r^3+1625*ln(c*x^n)*b*d^2*r^2-3750*ln(c*x^n)*b*d^2*r+4*b*d^2*
n*r^4-60*b*d^2*n*r^3-1000*b*d*e*n*r*x^r+1625*a*d^2*r^2-3750*a*d^2*r-50*(x^
r)^2*ln(c*x^n)*b*e^2*r^3+625*(x^r)^2*ln(c*x^n)*b*e^2*r^2-2500*(x^r)^2*ln(c
*x^n)*b*e^2*r+200*b*d*e*n*r^2*x^r+2000*a*d*e*r^2*x^r-6250*a*d*e*r*x^r+25*b
*e^2*n*r^2*(x^r)^2-200*x^r*ln(c*x^n)*b*d*e*r^3+2000*x^r*ln(c*x^n)*b*d*e*r^
2-6250*x^r*ln(c*x^n)*b*d*e*r)/(-5+2*r)^2/(r^2-10*r+25)
```

3.390.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 466 vs. $2(118) = 236$.

Time = 0.33 (sec) , antiderivative size = 466, normalized size of antiderivative = 3.67

$$\int \frac{(d+ex^r)^2\,(a+b\log{(cx^n)})}{x^6}\,dx =$$
$$-\frac{4\,(bd^2n+5\,ad^2)r^4+625\,bd^2n-60\,(bd^2n+5\,ad^2)r^3+3125\,ad^2+325\,(bd^2n+5\,ad^2)r^2-750\,(bd^2n+5$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/25*(4*(b*d^2*n + 5*a*d^2)*r^4 + 625*b*d^2*n - 60*(b*d^2*n + 5*a*d^2)*r^
3 + 3125*a*d^2 + 325*(b*d^2*n + 5*a*d^2)*r^2 - 750*(b*d^2*n + 5*a*d^2)*r -
 25*(2*a*e^2*r^3 - 25*b*e^2*n - 125*a*e^2 - (b*e^2*n + 25*a*e^2)*r^2 + 10*
(b*e^2*n + 10*a*e^2)*r + (2*b*e^2*r^3 - 25*b*e^2*r^2 + 100*b*e^2*r - 125*b
*e^2)*log(c) + (2*b*e^2*n*r^3 - 25*b*e^2*n*r^2 + 100*b*e^2*n*r - 125*b*e^2
*n)*log(x))*x^(2*r) - 50*(4*a*d*e*r^3 - 25*b*d*e*n - 125*a*d*e - 4*(b*d*e*
n + 10*a*d*e)*r^2 + 5*(4*b*d*e*n + 25*a*d*e)*r + (4*b*d*e*r^3 - 40*b*d*e*r
^2 + 125*b*d*e*r - 125*b*d*e)*log(c) + (4*b*d*e*n*r^3 - 40*b*d*e*n*r^2 + 1
25*b*d*e*n*r - 125*b*d*e*n)*log(x))*x^r + 5*(4*b*d^2*r^4 - 60*b*d^2*r^3 +
325*b*d^2*r^2 - 750*b*d^2*r + 625*b*d^2)*log(c) + 5*(4*b*d^2*n*r^4 - 60*b*
d^2*n*r^3 + 325*b*d^2*n*r^2 - 750*b*d^2*n*r + 625*b*d^2*n)*log(x))/((4*r^4
 - 60*r^3 + 325*r^2 - 750*r + 625)*x^5)
```

3.390.6 Sympy [A] (verification not implemented)

Time = 139.22 (sec) , antiderivative size = 233, normalized size of antiderivative = 1.83

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^6}\,dx$$
$$= -\frac{ad^2}{5x^5} + 2ade\left(\begin{cases}\frac{x^r}{rx^5-5x^5} & \text{for } r\neq 5\\ \frac{x^r\log(x)}{x^5} & \text{otherwise}\end{cases}\right) + ae^2\left(\begin{cases}\frac{x^{2r}}{2rx^5-5x^5} & \text{for } r\neq \frac{5}{2}\\ \frac{x^{2r}\log(x)}{x^5} & \text{otherwise}\end{cases}\right) - \frac{bd^2n}{25x^5}$$
$$- \frac{bd^2\log(cx^n)}{5x^5} - 2bden\left(\begin{cases}\frac{\begin{cases}\frac{x^{r-5}}{r-5} & \text{for } r\neq 5\\ \log(x) & \text{otherwise}\end{cases}}{r-5} & \text{for } r>-\infty \wedge r<\infty \wedge r\neq 5\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 2bde\left(\begin{cases}\frac{x^{r-5}}{r-5} & \text{for } r\neq 5\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$
$$- be^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r-5}}{2r-5} & \text{for } r\neq \frac{5}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r-5} & \text{for } r>-\infty \wedge r<\infty \wedge r\neq \frac{5}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ be^2\left(\begin{cases}\frac{x^{2r-5}}{2r-5} & \text{for } r\neq \frac{5}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**6,x)
```

output
```
-a*d**2/(5*x**5) + 2*a*d*e*Piecewise((x**r/(r*x**5 - 5*x**5), Ne(r, 5)), (
x**r*log(x)/x**5, True)) + a*e**2*Piecewise((x**(2*r)/(2*r*x**5 - 5*x**5),
 Ne(r, 5/2)), (x**(2*r)*log(x)/x**5, True)) - b*d**2*n/(25*x**5) - b*d**2*
log(c*x**n)/(5*x**5) - 2*b*d*e*n*Piecewise((Piecewise((x**(r - 5)/(r - 5),
 Ne(r, 5)), (log(x), True))/(r - 5), (r > -oo) & (r < oo) & Ne(r, 5)), (lo
g(x)**2/2, True)) + 2*b*d*e*Piecewise((x**(r - 5)/(r - 5), Ne(r, 5)), (log
(x), True))*log(c*x**n) - b*e**2*n*Piecewise((Piecewise((x**(2*r - 5)/(2*r
 - 5), Ne(r, 5/2)), (log(x), True))/(2*r - 5), (r > -oo) & (r < oo) & Ne(r
, 5/2)), (log(x)**2/2, True)) + b*e**2*Piecewise((x**(2*r - 5)/(2*r - 5),
Ne(r, 5/2)), (log(x), True))*log(c*x**n)
```

3.390.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^6} dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-6>0)', see `assume?` for more
details)Is
```

3.390.8 Giac [F]

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^6} dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x^6} dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x^6, x)
```

3.390.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^6} dx = \int \frac{(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))}{x^6} dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^6,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^6, x)
```

3.391 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^8}\,dx$

3.391.1 Optimal result

Integrand size = 23, antiderivative size = 127

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^2n}{49x^7}-\frac{2bdenx^{-7+r}}{(7-r)^2}-\frac{be^2nx^{-7+2r}}{(7-2r)^2}-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2dex^{-7+r}(a+b\log(cx^n))}{7-r}-\frac{e^2x^{-7+2r}(a+b\log(cx^n))}{7-2r}$$

output
```
-1/49*b*d^2*n/x^7-2*b*d*e*n*x^(-7+r)/(7-r)^2-b*e^2*n*x^(-7+2*r)/(7-2*r)^2-
1/7*d^2*(a+b*ln(c*x^n))/x^7-2*d*e*x^(-7+r)*(a+b*ln(c*x^n))/(7-r)-e^2*x^(-7
+2*r)*(a+b*ln(c*x^n))/(7-2*r)
```

3.391.2 Mathematica [A] (verified)

Time = 0.21 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.00

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^8}\,dx = \frac{bn\left(-d^2-\frac{98dex^r}{(-7+r)^2}-\frac{49e^2x^{2r}}{(7-2r)^2}\right)+a\left(-7d^2+\frac{98dex^r}{-7+r}+\frac{49e^2x^{2r}}{-7+2r}\right)+7b\left(-d^2+\frac{14dex^r}{-7+r}+\frac{7e^2x^{2r}}{-7+2r}\right)\log(cx^n)}{49x^7}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*(-d^2 - (98*d*e*x^r)/(-7 + r)^2 - (49*e^2*x^(2*r))/(7 - 2*r)^2) + a*(
-7*d^2 + (98*d*e*x^r)/(-7 + r) + (49*e^2*x^(2*r))/(-7 + 2*r)) + 7*b*(-d^2
+ (14*d*e*x^r)/(-7 + r) + (7*e^2*x^(2*r))/(-7 + 2*r))*Log[c*x^n])/(49*x^7)
```

3.391.3 Rubi [A] (verified)

Time = 0.40 (sec) , antiderivative size = 128, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^8} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{14dex^r}{7-r}+\frac{7e^2x^{2r}}{7-2r}+d^2}{7x^8}dx-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2dex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{e^2x^{2r-7}(a+b\log(cx^n))}{7-2r}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{7}bn\int \frac{\frac{14dex^r}{7-r}+\frac{7e^2x^{2r}}{7-2r}+d^2}{x^8}dx-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2dex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{e^2x^{2r-7}(a+b\log(cx^n))}{7-2r}$$

$$\Big\downarrow \text{1691}$$

$$\frac{1}{7}bn\int \left(-\frac{14dex^{r-8}}{r-7}+\frac{7e^2x^{2(r-4)}}{7-2r}+\frac{d^2}{x^8}\right)dx-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2dex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{e^2x^{2r-7}(a+b\log(cx^n))}{7-2r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^2(a+b\log(cx^n))}{7x^7}-\frac{2dex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{e^2x^{2r-7}(a+b\log(cx^n))}{7-2r}+\frac{1}{7}bn\left(-\frac{d^2}{7x^7}-\frac{14dex^{r-7}}{(7-r)^2}-\frac{7e^2x^{2r-7}}{(7-2r)^2}\right)$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*(-1/7*d^2/x^7 - (14*d*e*x^(-7 + r))/(7 - r)^2 - (7*e^2*x^(-7 + 2*r))/
(7 - 2*r)^2))/7 - (d^2*(a + b*Log[c*x^n]))/(7*x^7) - (2*d*e*x^(-7 + r)*(a
+ b*Log[c*x^n]))/(7 - r) - (e^2*x^(-7 + 2*r)*(a + b*Log[c*x^n]))/(7 - 2*r)
```

3.391.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.391.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 472 vs. $2(123) = 246$.

Time = 3.26 (sec) , antiderivative size = 473, normalized size of antiderivative = 3.72

method	result
parallelrisch	$-\frac{16807 b \ln(c x^n) d^2+4802 b d e n x^r+637 b d^2 n r^2+33614 d e x^r a-2058 b d^2 n r+33614 d e x^r b \ln(c x^n)+28 a d^2 r^4-588 a d^2 r^3-392 a}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

output
```
-1/49/x^7*(16807*b*ln(c*x^n)*d^2-686*b*e^2*n*r*(x^r)^2+4802*b*d*e*n*x^r+17
15*a*e^2*r^2*(x^r)^2-9604*a*e^2*r*(x^r)^2+2401*b*e^2*n*(x^r)^2-98*a*e^2*r^
3*(x^r)^2+16807*e^2*(x^r)^2*a+637*b*d^2*n*r^2+33614*d*e*x^r*a+16807*e^2*(x
^r)^2*b*ln(c*x^n)-2058*b*d^2*n*r+33614*d*e*x^r*b*ln(c*x^n)+28*a*d^2*r^4-58
8*a*d^2*r^3-392*a*d*e*r^3*x^r+2401*b*d^2*n+16807*a*d^2+28*ln(c*x^n)*b*d^2*
r^4-588*ln(c*x^n)*b*d^2*r^3+4459*ln(c*x^n)*b*d^2*r^2-14406*ln(c*x^n)*b*d^2
*r+4*b*d^2*n*r^4-84*b*d^2*n*r^3-2744*b*d*e*n*r*x^r+4459*a*d^2*r^2-14406*a*
d^2*r-98*(x^r)^2*ln(c*x^n)*b*e^2*r^3+1715*(x^r)^2*ln(c*x^n)*b*e^2*r^2-9604
*(x^r)^2*ln(c*x^n)*b*e^2*r+392*b*d*e*n*r^2*x^r+5488*a*d*e*r^2*x^r-24010*a*
d*e*r*x^r+49*b*e^2*n*r^2*(x^r)^2-392*x^r*ln(c*x^n)*b*d*e*r^3+5488*x^r*ln(c
*x^n)*b*d*e*r^2-24010*x^r*ln(c*x^n)*b*d*e*r)/(-7+2*r)^2/(-7+r)^2
```

3.391.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 466 vs. $2(118) = 236$.

Time = 0.32 (sec) , antiderivative size = 466, normalized size of antiderivative = 3.67

$$\int \frac{(d + ex^r)^2 (a + b \log(cx^n))}{x^8} dx = -\frac{4 (bd^2n + 7 ad^2)r^4 + 2401 bd^2n - 84 (bd^2n + 7 ad^2)r^3 + 16807 ad^2 + 637 (bd^2n + 7 ad^2)r^2 - 2058 (bd^2n}{}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

output
```
-1/49*(4*(b*d^2*n + 7*a*d^2)*r^4 + 2401*b*d^2*n - 84*(b*d^2*n + 7*a*d^2)*r
^3 + 16807*a*d^2 + 637*(b*d^2*n + 7*a*d^2)*r^2 - 2058*(b*d^2*n + 7*a*d^2)*
r - 49*(2*a*e^2*r^3 - 49*b*e^2*n - 343*a*e^2 - (b*e^2*n + 35*a*e^2)*r^2 +
14*(b*e^2*n + 14*a*e^2)*r + (2*b*e^2*r^3 - 35*b*e^2*r^2 + 196*b*e^2*r - 34
3*b*e^2)*log(c) + (2*b*e^2*n*r^3 - 35*b*e^2*n*r^2 + 196*b*e^2*n*r - 343*b*
e^2*n)*log(x))*x^(2*r) - 98*(4*a*d*e*r^3 - 49*b*d*e*n - 343*a*d*e - 4*(b*d
*e*n + 14*a*d*e)*r^2 + 7*(4*b*d*e*n + 35*a*d*e)*r + (4*b*d*e*r^3 - 56*b*d*
e*r^2 + 245*b*d*e*r - 343*b*d*e)*log(c) + (4*b*d*e*n*r^3 - 56*b*d*e*n*r^2
+ 245*b*d*e*n*r - 343*b*d*e*n)*log(x))*x^r + 7*(4*b*d^2*r^4 - 84*b*d^2*r^3
 + 637*b*d^2*r^2 - 2058*b*d^2*r + 2401*b*d^2)*log(c) + 7*(4*b*d^2*n*r^4 -
84*b*d^2*n*r^3 + 637*b*d^2*n*r^2 - 2058*b*d^2*n*r + 2401*b*d^2*n)*log(x))/
((4*r^4 - 84*r^3 + 637*r^2 - 2058*r + 2401)*x^7)
```

3.391.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^8}\,dx = \text{Timed out}$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x**8,x)
```

output
```
Timed out
```

3.391.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^8}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-8>0)', see `assume?` for more
details)Is
```

3.391.8 Giac [F]

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x^8}\,dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)}{x^8}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x^8, x)
```

3.391.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x^8}\,dx = \int \frac{(d+e\,x^r)^2 (a+b\,\ln(c\,x^n))}{x^8}\,dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^8,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x^8, x)
```

3.392 $\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx$

3.392.1 Optimal result

Integrand size = 23, antiderivative size = 147

$$\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx=-\frac{1}{36}bd^3nx^6-\frac{be^3nx^{3(2+r)}}{9(2+r)^2}-\frac{3bde^2nx^{2(3+r)}}{4(3+r)^2}-\frac{3bd^2enx^{6+r}}{(6+r)^2}+\frac{1}{6}\left(d^3x^6+\frac{2e^3x^{3(2+r)}}{2+r}+\frac{9de^2x^{2(3+r)}}{3+r}+\frac{18d^2ex^{6+r}}{6+r}\right)(a+b\log(cx^n))$$

output
```
-1/36*b*d^3*n*x^6-1/9*b*e^3*n*x^(6+3*r)/(2+r)^2-3/4*b*d*e^2*n*x^(6+2*r)/(3
+r)^2-3*b*d^2*e*n*x^(6+r)/(6+r)^2+1/6*(d^3*x^6+2*e^3*x^(6+3*r)/(2+r)+9*d*e
^2*x^(6+2*r)/(3+r)+18*d^2*e*x^(6+r)/(6+r))*(a+b*ln(c*x^n))
```

3.392.2 Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 172, normalized size of antiderivative = 1.17

$$\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx=\frac{1}{36}x^6\left(bn\left(-d^3-\frac{108d^2ex^r}{(6+r)^2}-\frac{27de^2x^{2r}}{(3+r)^2}-\frac{4e^3x^{3r}}{(2+r)^2}\right)+6a\left(d^3+\frac{18d^2ex^r}{6+r}+\frac{9de^2x^{2r}}{3+r}+\frac{2e^3x^{3r}}{2+r}\right)+6b\left(d^3+\frac{18d^2ex^r}{6+r}+\frac{9de^2x^{2r}}{3+r}+\frac{2e^3x^{3r}}{2+r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^5*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^6*(b*n*(-d^3 - (108*d^2*e*x^r)/(6 + r)^2 - (27*d*e^2*x^(2*r))/(3 + r)^2
 - (4*e^3*x^(3*r))/(2 + r)^2) + 6*a*(d^3 + (18*d^2*e*x^r)/(6 + r) + (9*d*e
^2*x^(2*r))/(3 + r) + (2*e^3*x^(3*r))/(2 + r)) + 6*b*(d^3 + (18*d^2*e*x^r)
/(6 + r) + (9*d*e^2*x^(2*r))/(3 + r) + (2*e^3*x^(3*r))/(2 + r))*Log[c*x^n]
))/36
```

3.392.3 Rubi [A] (verified)

Time = 0.55 (sec) , antiderivative size = 146, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^5(d+ex^r)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{6}\left(d^3x^6+\frac{18d^2ex^{r+6}}{r+6}+\frac{9de^2x^{2(r+3)}}{r+3}+\frac{2e^3x^{3(r+2)}}{r+2}\right)(a+b\log(cx^n))-bn\int \frac{1}{6}x^5\left(\frac{18d^2ex^r}{r+6}+\frac{9de^2x^{2r}}{r+3}+\frac{2e^3x^{3r}}{r+2}+d^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{6}\left(d^3x^6+\frac{18d^2ex^{r+6}}{r+6}+\frac{9de^2x^{2(r+3)}}{r+3}+\frac{2e^3x^{3(r+2)}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{6}bn\int x^5\left(\frac{18d^2ex^r}{r+6}+\frac{9de^2x^{2r}}{r+3}+\frac{2e^3x^{3r}}{r+2}+d^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{6}\left(d^3x^6+\frac{18d^2ex^{r+6}}{r+6}+\frac{9de^2x^{2(r+3)}}{r+3}+\frac{2e^3x^{3(r+2)}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{6}bn\int \left(\frac{18d^2ex^{r+5}}{r+6}+\frac{9de^2x^{2r+5}}{r+3}+\frac{2e^3x^{3r+5}}{r+2}+d^3x^5\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{6}\left(d^3x^6+\frac{18d^2ex^{r+6}}{r+6}+\frac{9de^2x^{2(r+3)}}{r+3}+\frac{2e^3x^{3(r+2)}}{r+2}\right)(a+b\log(cx^n))-\frac{1}{6}bn\left(\frac{d^3x^6}{6}+\frac{18d^2ex^{r+6}}{(r+6)^2}+\frac{9de^2x^{2(r+3)}}{2(r+3)^2}+\frac{2e^3x^{3(r+2)}}{3(r+2)^2}\right)$$

input
```
Int[x^5*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/6*(b*n*((d^3*x^6)/6 + (2*e^3*x^(3*(2 + r)))/(3*(2 + r)^2) + (9*d*e^2*x^
(2*(3 + r)))/(2*(3 + r)^2) + (18*d^2*e*x^(6 + r))/(6 + r)^2)) + ((d^3*x^6
+ (2*e^3*x^(3*(2 + r)))/(2 + r) + (9*d*e^2*x^(2*(3 + r)))/(3 + r) + (18*d^
2*e*x^(6 + r))/(6 + r))*(a + b*Log[c*x^n]))/6
```

3.392.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.392.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1248 vs. 2(139) = 278.

Time = 40.92 (sec) , antiderivative size = 1249, normalized size of antiderivative = 8.50

method	result	size
parallelrisch	Expression too large to display	1249
risch	Expression too large to display	4021

input
```
int(x^5*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/36*(-1026*x^6*(x^r)^2*a*d*e^2*r^4-7344*x^6*(x^r)^2*a*d*e^2*r^3-11664*x^
6*(x^r)^3*ln(c*x^n)*b*e^3*r-23328*e^2*d*b*ln(c*x^n)*(x^r)^2*x^6+4*x^6*(x^r
)^3*b*e^3*n*r^4+72*x^6*(x^r)^3*b*e^3*n*r^3+468*x^6*(x^r)^3*b*e^3*n*r^2+129
6*x^6*(x^r)^3*b*e^3*n*r-7776*a*d^3*x^6-30456*x^6*x^r*a*d^2*e*r^2-42768*x^6
*x^r*a*d^2*e*r+3888*x^6*x^r*b*d^2*e*n-23328*e*d^2*b*ln(c*x^n)*x^r*x^6-12*x
^6*(x^r)^3*ln(c*x^n)*b*e^3*r^5-108*x^6*x^r*a*d^2*e*r^5-1728*x^6*x^r*a*d^2*
e*r^4-10476*x^6*x^r*a*d^2*e*r^3-7776*e^3*b*ln(c*x^n)*(x^r)^3*x^6-12528*x^6
*ln(c*x^n)*b*d^3*r^2-15552*x^6*ln(c*x^n)*b*d^3*r-12*x^6*(x^r)^3*a*e^3*r^5-
240*x^6*(x^r)^3*a*e^3*r^4-1836*x^6*(x^r)^3*a*e^3*r^3-6696*x^6*(x^r)^3*a*e^
3*r^2-11664*x^6*(x^r)^3*a*e^3*r+1296*x^6*(x^r)^3*b*e^3*n-23328*x^6*x^r*a*d
^2*e-23328*x^6*(x^r)^2*a*d*e^2+x^6*b*d^3*n*r^6+22*x^6*b*d^3*n*r^5+193*x^6*
b*d^3*n*r^4+864*x^6*b*d^3*n*r^3+2088*x^6*b*d^3*n*r^2+2592*x^6*b*d^3*n*r-6*
x^6*ln(c*x^n)*b*d^3*r^6-132*x^6*ln(c*x^n)*b*d^3*r^5-240*x^6*(x^r)^3*ln(c*x
^n)*b*e^3*r^4-1836*x^6*(x^r)^3*ln(c*x^n)*b*e^3*r^3-6696*x^6*(x^r)^3*ln(c*x
^n)*b*e^3*r^2-38880*x^6*(x^r)^2*a*d*e^2*r+3888*x^6*(x^r)^2*b*d*e^2*n-24624
*x^6*(x^r)^2*a*d*e^2*r^2-54*x^6*(x^r)^2*a*d*e^2*r^5-7776*x^6*(x^r)^3*a*e^3
-6*x^6*a*d^3*r^6-132*x^6*a*d^3*r^5-1158*x^6*a*d^3*r^4-5184*x^6*a*d^3*r^3-1
2528*x^6*a*d^3*r^2-15552*x^6*a*d^3*r-1158*x^6*ln(c*x^n)*b*d^3*r^4-5184*x^6
*ln(c*x^n)*b*d^3*r^3-108*x^6*x^r*ln(c*x^n)*b*d^2*e*r^5-1728*x^6*x^r*ln(c*x
^n)*b*d^2*e*r^4-10476*x^6*x^r*ln(c*x^n)*b*d^2*e*r^3-30456*x^6*x^r*ln(c*...
```

3.392.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1011 vs. $2(139) = 278$.

Time = 0.32 (sec) , antiderivative size = 1011, normalized size of antiderivative = 6.88

$$\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx$$
$$= \frac{6\,(bd^3r^6+22\,bd^3r^5+193\,bd^3r^4+864\,bd^3r^3+2088\,bd^3r^2+2592\,bd^3r+1296\,bd^3)x^6\log(c)+6\,(bd^3nr^6+ \cdots}{\cdots}$$

input
```
integrate(x^5*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/36*(6*(b*d^3*r^6 + 22*b*d^3*r^5 + 193*b*d^3*r^4 + 864*b*d^3*r^3 + 2088*b
*d^3*r^2 + 2592*b*d^3*r + 1296*b*d^3)*x^6*log(c) + 6*(b*d^3*n*r^6 + 22*b*d
^3*n*r^5 + 193*b*d^3*n*r^4 + 864*b*d^3*n*r^3 + 2088*b*d^3*n*r^2 + 2592*b*d
^3*n*r + 1296*b*d^3*n)*x^6*log(x) - ((b*d^3*n - 6*a*d^3)*r^6 + 22*(b*d^3*n
 - 6*a*d^3)*r^5 + 1296*b*d^3*n + 193*(b*d^3*n - 6*a*d^3)*r^4 - 7776*a*d^3
+ 864*(b*d^3*n - 6*a*d^3)*r^3 + 2088*(b*d^3*n - 6*a*d^3)*r^2 + 2592*(b*d^3
*n - 6*a*d^3)*r)*x^6 + 4*(3*(b*e^3*r^5 + 20*b*e^3*r^4 + 153*b*e^3*r^3 + 55
8*b*e^3*r^2 + 972*b*e^3*r + 648*b*e^3)*x^6*log(c) + 3*(b*e^3*n*r^5 + 20*b*
e^3*n*r^4 + 153*b*e^3*n*r^3 + 558*b*e^3*n*r^2 + 972*b*e^3*n*r + 648*b*e^3*
n)*x^6*log(x) + (3*a*e^3*r^5 - 324*b*e^3*n - (b*e^3*n - 60*a*e^3)*r^4 + 19
44*a*e^3 - 9*(2*b*e^3*n - 51*a*e^3)*r^3 - 9*(13*b*e^3*n - 186*a*e^3)*r^2 -
 324*(b*e^3*n - 9*a*e^3)*r)*x^6)*x^(3*r) + 27*(2*(b*d*e^2*r^5 + 19*b*d*e^2
*r^4 + 136*b*d*e^2*r^3 + 456*b*d*e^2*r^2 + 720*b*d*e^2*r + 432*b*d*e^2)*x^
6*log(c) + 2*(b*d*e^2*n*r^5 + 19*b*d*e^2*n*r^4 + 136*b*d*e^2*n*r^3 + 456*b
*d*e^2*n*r^2 + 720*b*d*e^2*n*r + 432*b*d*e^2*n)*x^6*log(x) + (2*a*d*e^2*r^
5 - 144*b*d*e^2*n - (b*d*e^2*n - 38*a*d*e^2)*r^4 + 864*a*d*e^2 - 16*(b*d*e
^2*n - 17*a*d*e^2)*r^3 - 8*(11*b*d*e^2*n - 114*a*d*e^2)*r^2 - 96*(2*b*d*e^
2*n - 15*a*d*e^2)*r)*x^6)*x^(2*r) + 108*((b*d^2*e*r^5 + 16*b*d^2*e*r^4 + 9
7*b*d^2*e*r^3 + 282*b*d^2*e*r^2 + 396*b*d^2*e*r + 216*b*d^2*e)*x^6*log(c)
+ (b*d^2*e*n*r^5 + 16*b*d^2*e*n*r^4 + 97*b*d^2*e*n*r^3 + 282*b*d^2*e*n*...
```

3.392.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 4100 vs. 2(143) = 286.

Time = 92.42 (sec) , antiderivative size = 4100, normalized size of antiderivative = 27.89

$$\int x^5(d+ex^r)^3\,(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x**5*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*d**3*x**6/6 + 3*a*d**2*e*log(c*x**n)/n - a*d*e**2/(2*x**6) -
a*e**3/(12*x**12) - b*d**3*n*x**6/36 + b*d**3*x**6*log(c*x**n)/6 + 3*b*d**
2*e*log(c*x**n)**2/(2*n) - b*d*e**2*n/(12*x**6) - b*d*e**2*log(c*x**n)/(2*
x**6) - b*e**3*n/(144*x**12) - b*e**3*log(c*x**n)/(12*x**12), Eq(r, -6)),
(a*d**3*x**6/6 + a*d**2*e*x**3 + 3*a*d*e**2*log(c*x**n)/n - a*e**3/(3*x**3
) - b*d**3*n*x**6/36 + b*d**3*x**6*log(c*x**n)/6 - b*d**2*e*n*x**3/3 + b*d
**2*e*x**3*log(c*x**n) + 3*b*d*e**2*log(c*x**n)**2/(2*n) - b*e**3*n/(9*x**
3) - b*e**3*log(c*x**n)/(3*x**3), Eq(r, -3)), (a*d**3*x**6/6 + 3*a*d**2*e*
x**4/4 + 3*a*d*e**2*x**2/2 + a*e**3*log(c*x**n)/n - b*d**3*n*x**6/36 + b*d
**3*x**6*log(c*x**n)/6 - 3*b*d**2*e*n*x**4/16 + 3*b*d**2*e*x**4*log(c*x**n
)/4 - 3*b*d*e**2*n*x**2/4 + 3*b*d*e**2*x**2*log(c*x**n)/2 + b*e**3*log(c*x
**n)**2/(2*n), Eq(r, -2)), (6*a*d**3*r**6*x**6/(36*r**6 + 792*r**5 + 6948*
r**4 + 31104*r**3 + 75168*r**2 + 93312*r + 46656) + 132*a*d**3*r**5*x**6/(
36*r**6 + 792*r**5 + 6948*r**4 + 31104*r**3 + 75168*r**2 + 93312*r + 46656
) + 1158*a*d**3*r**4*x**6/(36*r**6 + 792*r**5 + 6948*r**4 + 31104*r**3 + 7
5168*r**2 + 93312*r + 46656) + 5184*a*d**3*r**3*x**6/(36*r**6 + 792*r**5 +
 6948*r**4 + 31104*r**3 + 75168*r**2 + 93312*r + 46656) + 12528*a*d**3*r**
2*x**6/(36*r**6 + 792*r**5 + 6948*r**4 + 31104*r**3 + 75168*r**2 + 93312*r
 + 46656) + 15552*a*d**3*r*x**6/(36*r**6 + 792*r**5 + 6948*r**4 + 31104*r*
*3 + 75168*r**2 + 93312*r + 46656) + 7776*a*d**3*x**6/(36*r**6 + 792*r*...
```

3.392.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 218, normalized size of antiderivative = 1.48

$$\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx = -\frac{1}{36}bd^3nx^6+\frac{1}{6}bd^3x^6\log(cx^n)+\frac{1}{6}ad^3x^6+\frac{be^3x^{3r+6}\log(cx^n)}{3(r+2)}+\frac{3bde^2x^{2r+6}\log(cx^n)}{2(r+3)}+\frac{3bd^2ex^{r+6}\log(cx^n)}{r+6}-\frac{be^3nx^{3r+6}}{9(r+2)^2}+\frac{ae^3x^{3r+6}}{3(r+2)}-\frac{3bde^2nx^{2r+6}}{4(r+3)^2}+\frac{3ade^2x^{2r+6}}{2(r+3)}-\frac{3bd^2enx^{r+6}}{(r+6)^2}+\frac{3ad^2ex^{r+6}}{r+6}$$

input
```
integrate(x^5*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/36*b*d^3*n*x^6 + 1/6*b*d^3*x^6*log(c*x^n) + 1/6*a*d^3*x^6 + 1/3*b*e^3*x
^(3*r + 6)*log(c*x^n)/(r + 2) + 3/2*b*d*e^2*x^(2*r + 6)*log(c*x^n)/(r + 3)
 + 3*b*d^2*e*x^(r + 6)*log(c*x^n)/(r + 6) - 1/9*b*e^3*n*x^(3*r + 6)/(r + 2
)^2 + 1/3*a*e^3*x^(3*r + 6)/(r + 2) - 3/4*b*d*e^2*n*x^(2*r + 6)/(r + 3)^2
+ 3/2*a*d*e^2*x^(2*r + 6)/(r + 3) - 3*b*d^2*e*n*x^(r + 6)/(r + 6)^2 + 3*a*
d^2*e*x^(r + 6)/(r + 6)
```

3.392.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1609 vs. 2(139) = 278.

Time = 0.37 (sec) , antiderivative size = 1609, normalized size of antiderivative = 10.95

$$\int x^5(d+ex^r)^3(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x^5*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/36*(12*b*e^3*n*r^5*x^6*x^(3*r)*log(x) + 54*b*d*e^2*n*r^5*x^6*x^(2*r)*log
(x) + 108*b*d^2*e*n*r^5*x^6*x^r*log(x) + 6*b*d^3*n*r^6*x^6*log(x) - b*d^3*
n*r^6*x^6 + 12*b*e^3*r^5*x^6*x^(3*r)*log(c) + 54*b*d*e^2*r^5*x^6*x^(2*r)*l
og(c) + 108*b*d^2*e*r^5*x^6*x^r*log(c) + 6*b*d^3*r^6*x^6*log(c) + 240*b*e^
3*n*r^4*x^6*x^(3*r)*log(x) + 1026*b*d*e^2*n*r^4*x^6*x^(2*r)*log(x) + 1728*
b*d^2*e*n*r^4*x^6*x^r*log(x) + 132*b*d^3*n*r^5*x^6*log(x) - 4*b*e^3*n*r^4*
x^6*x^(3*r) + 12*a*e^3*r^5*x^6*x^(3*r) - 27*b*d*e^2*n*r^4*x^6*x^(2*r) + 54
*a*d*e^2*r^5*x^6*x^(2*r) - 108*b*d^2*e*n*r^4*x^6*x^r + 108*a*d^2*e*r^5*x^6
*x^r - 22*b*d^3*n*r^5*x^6 + 6*a*d^3*r^6*x^6 + 240*b*e^3*r^4*x^6*x^(3*r)*lo
g(c) + 1026*b*d*e^2*r^4*x^6*x^(2*r)*log(c) + 1728*b*d^2*e*r^4*x^6*x^r*log(
c) + 132*b*d^3*r^5*x^6*log(c) + 1836*b*e^3*n*r^3*x^6*x^(3*r)*log(x) + 7344
*b*d*e^2*n*r^3*x^6*x^(2*r)*log(x) + 10476*b*d^2*e*n*r^3*x^6*x^r*log(x) + 1
158*b*d^3*n*r^4*x^6*log(x) - 72*b*e^3*n*r^3*x^6*x^(3*r) + 240*a*e^3*r^4*x^
6*x^(3*r) - 432*b*d*e^2*n*r^3*x^6*x^(2*r) + 1026*a*d*e^2*r^4*x^6*x^(2*r) -
 1080*b*d^2*e*n*r^3*x^6*x^r + 1728*a*d^2*e*r^4*x^6*x^r - 193*b*d^3*n*r^4*x
^6 + 132*a*d^3*r^5*x^6 + 1836*b*e^3*r^3*x^6*x^(3*r)*log(c) + 7344*b*d*e^2*
r^3*x^6*x^(2*r)*log(c) + 10476*b*d^2*e*r^3*x^6*x^r*log(c) + 1158*b*d^3*r^4
*x^6*log(c) + 6696*b*e^3*n*r^2*x^6*x^(3*r)*log(x) + 24624*b*d*e^2*n*r^2*x^
6*x^(2*r)*log(x) + 30456*b*d^2*e*n*r^2*x^6*x^r*log(x) + 5184*b*d^3*n*r^3*x
^6*log(x) - 468*b*e^3*n*r^2*x^6*x^(3*r) + 1836*a*e^3*r^3*x^6*x^(3*r) - ...
```

3.392.9 Mupad [F(-1)]

Timed out.

$$\int x^5(d+ex^r)^3\,(a+b\log{(cx^n)})\,dx=\int x^5\,(d+e\,x^r)^3\,(a+b\,\ln{(c\,x^n)})\,dx$$

input
```
int(x^5*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int(x^5*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.393 $\int x^3(d+ex^r)^3(a+b\log(cx^n))\,dx$

3.393.1 Optimal result

Integrand size = 23, antiderivative size = 149

$$\int x^3(d+ex^r)^3(a+b\log(cx^n))\,dx=-\frac{1}{16}bd^3nx^4-\frac{3bde^2nx^{2(2+r)}}{4(2+r)^2}-\frac{3bd^2enx^{4+r}}{(4+r)^2}-\frac{be^3nx^{4+3r}}{(4+3r)^2}+\frac{1}{4}\left(d^3x^4+\frac{6de^2x^{2(2+r)}}{2+r}+\frac{12d^2ex^{4+r}}{4+r}+\frac{4e^3x^{4+3r}}{4+3r}\right)(a+b\log(cx^n))$$

output
```
-1/16*b*d^3*n*x^4-3/4*b*d*e^2*n*x^(4+2*r)/(2+r)^2-3*b*d^2*e*n*x^(4+r)/(4+r
)^2-b*e^3*n*x^(4+3*r)/(4+3*r)^2+1/4*(d^3*x^4+6*d*e^2*x^(4+2*r)/(2+r)+12*d^
2*e*x^(4+r)/(4+r)+4*e^3*x^(4+3*r)/(4+3*r))*(a+b*ln(c*x^n))
```

3.393.2 Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 178, normalized size of antiderivative = 1.19

$$\int x^3(d+ex^r)^3(a+b\log(cx^n))\,dx=\frac{1}{16}x^4\left(bn\left(-d^3-\frac{48d^2ex^r}{(4+r)^2}-\frac{12de^2x^{2r}}{(2+r)^2}-\frac{16e^3x^{3r}}{(4+3r)^2}\right)+4a\left(d^3+\frac{12d^2ex^r}{4+r}+\frac{6de^2x^{2r}}{2+r}+\frac{4e^3x^{3r}}{4+3r}\right)+4b\left(d^3+\frac{12d^2ex^r}{4+r}+\frac{6de^2x^{2r}}{2+r}+\frac{4e^3x^{3r}}{4+3r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^3*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^4*(b*n*(-d^3 - (48*d^2*e*x^r)/(4 + r)^2 - (12*d*e^2*x^(2*r))/(2 + r)^2
- (16*e^3*x^(3*r))/(4 + 3*r)^2) + 4*a*(d^3 + (12*d^2*e*x^r)/(4 + r) + (6*d
*e^2*x^(2*r))/(2 + r) + (4*e^3*x^(3*r))/(4 + 3*r)) + 4*b*(d^3 + (12*d^2*e*
x^r)/(4 + r) + (6*d*e^2*x^(2*r))/(2 + r) + (4*e^3*x^(3*r))/(4 + 3*r))*Log[
c*x^n]))/16
```

3.393.3 Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 146, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^3(d+ex^r)^3(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{4}\left(d^3x^4+\frac{12d^2ex^{r+4}}{r+4}+\frac{6de^2x^{2(r+2)}}{r+2}+\frac{4e^3x^{3r+4}}{3r+4}\right)(a+b\log(cx^n))-bn\int\frac{1}{4}x^3\left(\frac{12d^2ex^r}{r+4}+\frac{6de^2x^{2r}}{r+2}+\frac{4e^3x^{3r}}{3r+4}+d^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}\left(d^3x^4+\frac{12d^2ex^{r+4}}{r+4}+\frac{6de^2x^{2(r+2)}}{r+2}+\frac{4e^3x^{3r+4}}{3r+4}\right)(a+b\log(cx^n))-\frac{1}{4}bn\int x^3\left(\frac{12d^2ex^r}{r+4}+\frac{6de^2x^{2r}}{r+2}+\frac{4e^3x^{3r}}{3r+4}+d^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{4}\left(d^3x^4+\frac{12d^2ex^{r+4}}{r+4}+\frac{6de^2x^{2(r+2)}}{r+2}+\frac{4e^3x^{3r+4}}{3r+4}\right)(a+b\log(cx^n))-\frac{1}{4}bn\int\left(\frac{4e^3x^{3(r+1)}}{3r+4}+\frac{12d^2ex^{r+3}}{r+4}+\frac{6de^2x^{2r+3}}{r+2}+d^3x^3\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{4}\left(d^3x^4+\frac{12d^2ex^{r+4}}{r+4}+\frac{6de^2x^{2(r+2)}}{r+2}+\frac{4e^3x^{3r+4}}{3r+4}\right)(a+b\log(cx^n))-\frac{1}{4}bn\left(\frac{d^3x^4}{4}+\frac{12d^2ex^{r+4}}{(r+4)^2}+\frac{3de^2x^{2(r+2)}}{(r+2)^2}+\frac{4e^3x^{3r+4}}{(3r+4)^2}\right)$$

input
```
Int[x^3*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/4*(b*n*((d^3*x^4)/4 + (3*d*e^2*x^(2*(2 + r)))/(2 + r)^2 + (12*d^2*e*x^(
4 + r))/(4 + r)^2 + (4*e^3*x^(4 + 3*r))/(4 + 3*r)^2)) + ((d^3*x^4 + (6*d*e
^2*x^(2*(2 + r)))/(2 + r) + (12*d^2*e*x^(4 + r))/(4 + r) + (4*e^3*x^(4 + 3
*r))/(4 + 3*r))*(a + b*Log[c*x^n]))/4
```

3.393.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.393.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1261 vs. 2(143) = 286.

Time = 15.46 (sec) , antiderivative size = 1262, normalized size of antiderivative = 8.47

method	result	size
parallelrisch	Expression too large to display	1262
risch	Expression too large to display	4027

input
```
int(x^3*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/16*(-4096*a*d^3*x^4-12288*e^2*d*b*ln(c*x^n)*(x^r)^2*x^4-12288*e*d^2*b*l
n(c*x^n)*x^r*x^4-432*x^4*x^r*a*d^2*e*r^5-4608*x^4*x^r*a*d^2*e*r^4-18624*x^
4*x^r*a*d^2*e*r^3-36096*x^4*x^r*a*d^2*e*r^2-33792*x^4*x^r*a*d^2*e*r+3072*x
^4*x^r*b*d^2*e*n-48*x^4*(x^r)^3*ln(c*x^n)*b*e^3*r^5-640*x^4*(x^r)^3*ln(c*x
^n)*b*e^3*r^4-3264*x^4*(x^r)^3*ln(c*x^n)*b*e^3*r^3-7936*x^4*(x^r)^3*ln(c*x
^n)*b*e^3*r^2-9216*x^4*(x^r)^3*ln(c*x^n)*b*e^3*r-216*x^4*(x^r)^2*a*d*e^2*r
^5-2736*x^4*(x^r)^2*a*d*e^2*r^4-13056*x^4*(x^r)^2*a*d*e^2*r^3-29184*x^4*(x
^r)^2*a*d*e^2*r^2-30720*x^4*(x^r)^2*a*d*e^2*r+3072*x^4*(x^r)^2*b*d*e^2*n-4
096*x^4*ln(c*x^n)*b*d^3-12288*x^4*x^r*a*d^2*e+9*x^4*b*d^3*n*r^6+132*x^4*b*
d^3*n*r^5+772*x^4*b*d^3*n*r^4+2304*x^4*b*d^3*n*r^3+3712*x^4*b*d^3*n*r^2+30
72*x^4*b*d^3*n*r-12288*x^4*(x^r)^2*a*d*e^2-48*x^4*(x^r)^3*a*e^3*r^5-640*x^
4*(x^r)^3*a*e^3*r^4-3264*x^4*(x^r)^3*a*e^3*r^3-7936*x^4*(x^r)^3*a*e^3*r^2+
432*x^4*x^r*b*d^2*e*n*r^4+2880*x^4*x^r*b*d^2*e*n*r^3+7104*x^4*x^r*b*d^2*e*
n*r^2+7680*x^4*x^r*b*d^2*e*n*r-216*x^4*(x^r)^2*ln(c*x^n)*b*d*e^2*r^5-2736*
x^4*(x^r)^2*ln(c*x^n)*b*d*e^2*r^4-13056*x^4*(x^r)^2*ln(c*x^n)*b*d*e^2*r^3-
29184*x^4*(x^r)^2*ln(c*x^n)*b*d*e^2*r^2-30720*x^4*(x^r)^2*ln(c*x^n)*b*d*e^
2*r-432*x^4*x^r*ln(c*x^n)*b*d^2*e*r^5-4608*x^4*x^r*ln(c*x^n)*b*d^2*e*r^4-1
8624*x^4*x^r*ln(c*x^n)*b*d^2*e*r^3-36096*x^4*x^r*ln(c*x^n)*b*d^2*e*r^2-337
92*x^4*x^r*ln(c*x^n)*b*d^2*e*r+108*x^4*(x^r)^2*b*d*e^2*n*r^4+1152*x^4*(x^r
)^2*b*d*e^2*n*r^3+4224*x^4*(x^r)^2*b*d*e^2*n*r^2+6144*x^4*(x^r)^2*b*d*e...
```

3.393.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1022 vs. $2(143) = 286$.

Time = 0.34 (sec) , antiderivative size = 1022, normalized size of antiderivative = 6.86

$$\int x^3(d+ex^r)^3\left(a+b\log\left(cx^n\right)\right)\,dx = \text{Too large to display}$$

input
```
integrate(x^3*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/16*(4*(9*b*d^3*r^6 + 132*b*d^3*r^5 + 772*b*d^3*r^4 + 2304*b*d^3*r^3 + 37
12*b*d^3*r^2 + 3072*b*d^3*r + 1024*b*d^3)*x^4*log(c) + 4*(9*b*d^3*n*r^6 +
132*b*d^3*n*r^5 + 772*b*d^3*n*r^4 + 2304*b*d^3*n*r^3 + 3712*b*d^3*n*r^2 +
3072*b*d^3*n*r + 1024*b*d^3*n)*x^4*log(x) - (9*(b*d^3*n - 4*a*d^3)*r^6 + 1
32*(b*d^3*n - 4*a*d^3)*r^5 + 1024*b*d^3*n + 772*(b*d^3*n - 4*a*d^3)*r^4 -
4096*a*d^3 + 2304*(b*d^3*n - 4*a*d^3)*r^3 + 3712*(b*d^3*n - 4*a*d^3)*r^2 +
 3072*(b*d^3*n - 4*a*d^3)*r)*x^4 + 16*((3*b*e^3*r^5 + 40*b*e^3*r^4 + 204*b
*e^3*r^3 + 496*b*e^3*r^2 + 576*b*e^3*r + 256*b*e^3)*x^4*log(c) + (3*b*e^3*
n*r^5 + 40*b*e^3*n*r^4 + 204*b*e^3*n*r^3 + 496*b*e^3*n*r^2 + 576*b*e^3*n*r
 + 256*b*e^3*n)*x^4*log(x) + (3*a*e^3*r^5 - 64*b*e^3*n - (b*e^3*n - 40*a*e
^3)*r^4 + 256*a*e^3 - 12*(b*e^3*n - 17*a*e^3)*r^3 - 4*(13*b*e^3*n - 124*a*
e^3)*r^2 - 96*(b*e^3*n - 6*a*e^3)*r)*x^4)*x^(3*r) + 12*(2*(9*b*d*e^2*r^5 +
 114*b*d*e^2*r^4 + 544*b*d*e^2*r^3 + 1216*b*d*e^2*r^2 + 1280*b*d*e^2*r + 5
12*b*d*e^2)*x^4*log(c) + 2*(9*b*d*e^2*n*r^5 + 114*b*d*e^2*n*r^4 + 544*b*d*
e^2*n*r^3 + 1216*b*d*e^2*n*r^2 + 1280*b*d*e^2*n*r + 512*b*d*e^2*n)*x^4*log
(x) + (18*a*d*e^2*r^5 - 256*b*d*e^2*n - 3*(3*b*d*e^2*n - 76*a*d*e^2)*r^4 +
 1024*a*d*e^2 - 32*(3*b*d*e^2*n - 34*a*d*e^2)*r^3 - 32*(11*b*d*e^2*n - 76*
a*d*e^2)*r^2 - 512*(b*d*e^2*n - 5*a*d*e^2)*r)*x^4)*x^(2*r) + 48*((9*b*d^2*
e*r^5 + 96*b*d^2*e*r^4 + 388*b*d^2*e*r^3 + 752*b*d^2*e*r^2 + 704*b*d^2*e*r
 + 256*b*d^2*e)*x^4*log(c) + (9*b*d^2*e*n*r^5 + 96*b*d^2*e*n*r^4 + 388*...
```

3.393.6 Sympy [F(-1)]

Timed out.

$$\int x^3(d+ex^r)^3\left(a+b\log\left(cx^n\right)\right)\,dx = \text{Timed out}$$

input
```
integrate(x**3*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

3.393.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 222, normalized size of antiderivative = 1.49

$$\int x^3(d+ex^r)^3\,(a+b\log{(cx^n)})\,\,dx = -\frac{1}{16}\,bd^3nx^4 + \frac{1}{4}\,bd^3x^4\log{(cx^n)} + \frac{1}{4}\,ad^3x^4 + \frac{be^3x^{3\,r+4}\log{(cx^n)}}{3\,r+4} + \frac{3\,bde^2x^{2\,r+4}\log{(cx^n)}}{2\,(r+2)} + \frac{3\,bd^2ex^{r+4}\log{(cx^n)}}{r+4} - \frac{be^3nx^{3\,r+4}}{(3\,r+4)^2} + \frac{ae^3x^{3\,r+4}}{3\,r+4} - \frac{3\,bde^2nx^{2\,r+4}}{4\,(r+2)^2} + \frac{3\,ade^2x^{2\,r+4}}{2\,(r+2)} - \frac{3\,bd^2enx^{r+4}}{(r+4)^2} + \frac{3\,ad^2ex^{r+4}}{r+4}$$

input
```
integrate(x^3*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/16*b*d^3*n*x^4 + 1/4*b*d^3*x^4*log(c*x^n) + 1/4*a*d^3*x^4 + b*e^3*x^(3*
r + 4)*log(c*x^n)/(3*r + 4) + 3/2*b*d*e^2*x^(2*r + 4)*log(c*x^n)/(r + 2) +
 3*b*d^2*e*x^(r + 4)*log(c*x^n)/(r + 4) - b*e^3*n*x^(3*r + 4)/(3*r + 4)^2
+ a*e^3*x^(3*r + 4)/(3*r + 4) - 3/4*b*d*e^2*n*x^(2*r + 4)/(r + 2)^2 + 3/2*
a*d*e^2*x^(2*r + 4)/(r + 2) - 3*b*d^2*e*n*x^(r + 4)/(r + 4)^2 + 3*a*d^2*e*
x^(r + 4)/(r + 4)
```

3.393.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1611 vs. 2(143) = 286.

Time = 0.48 (sec) , antiderivative size = 1611, normalized size of antiderivative = 10.81

$$\int x^3(d+ex^r)^3\,(a+b\log{(cx^n)})\,\,dx = \text{Too large to display}$$

input
```
integrate(x^3*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/16*(48*b*e^3*n*r^5*x^4*x^(3*r)*log(x) + 216*b*d*e^2*n*r^5*x^4*x^(2*r)*lo
g(x) + 432*b*d^2*e*n*r^5*x^4*x^r*log(x) + 36*b*d^3*n*r^6*x^4*log(x) - 9*b*
d^3*n*r^6*x^4 + 48*b*e^3*r^5*x^4*x^(3*r)*log(c) + 216*b*d*e^2*r^5*x^4*x^(2
*r)*log(c) + 432*b*d^2*e*r^5*x^4*x^r*log(c) + 36*b*d^3*r^6*x^4*log(c) + 64
0*b*e^3*n*r^4*x^4*x^(3*r)*log(x) + 2736*b*d*e^2*n*r^4*x^4*x^(2*r)*log(x) +
 4608*b*d^2*e*n*r^4*x^4*x^r*log(x) + 528*b*d^3*n*r^5*x^4*log(x) - 16*b*e^3
*n*r^4*x^4*x^(3*r) + 48*a*e^3*r^5*x^4*x^(3*r) - 108*b*d*e^2*n*r^4*x^4*x^(2
*r) + 216*a*d*e^2*r^5*x^4*x^(2*r) - 432*b*d^2*e*n*r^4*x^4*x^r + 432*a*d^2*
e*r^5*x^4*x^r - 132*b*d^3*n*r^5*x^4 + 36*a*d^3*r^6*x^4 + 640*b*e^3*r^4*x^4
*x^(3*r)*log(c) + 2736*b*d*e^2*r^4*x^4*x^(2*r)*log(c) + 4608*b*d^2*e*r^4*x
^4*x^r*log(c) + 528*b*d^3*r^5*x^4*log(c) + 3264*b*e^3*n*r^3*x^4*x^(3*r)*lo
g(x) + 13056*b*d*e^2*n*r^3*x^4*x^(2*r)*log(x) + 18624*b*d^2*e*n*r^3*x^4*x^
r*log(x) + 3088*b*d^3*n*r^4*x^4*log(x) - 192*b*e^3*n*r^3*x^4*x^(3*r) + 640
*a*e^3*r^4*x^4*x^(3*r) - 1152*b*d*e^2*n*r^3*x^4*x^(2*r) + 2736*a*d*e^2*r^4
*x^4*x^(2*r) - 2880*b*d^2*e*n*r^3*x^4*x^r + 4608*a*d^2*e*r^4*x^4*x^r - 772
*b*d^3*n*r^4*x^4 + 528*a*d^3*r^5*x^4 + 3264*b*e^3*r^3*x^4*x^(3*r)*log(c) +
 13056*b*d*e^2*r^3*x^4*x^(2*r)*log(c) + 18624*b*d^2*e*r^3*x^4*x^r*log(c) +
 3088*b*d^3*r^4*x^4*log(c) + 7936*b*e^3*n*r^2*x^4*x^(3*r)*log(x) + 29184*b
*d*e^2*n*r^2*x^4*x^(2*r)*log(x) + 36096*b*d^2*e*n*r^2*x^4*x^r*log(x) + 921
6*b*d^3*n*r^3*x^4*log(x) - 832*b*e^3*n*r^2*x^4*x^(3*r) + 3264*a*e^3*r^3...
```

3.393.9 Mupad [F(-1)]

Timed out.

$$\int x^3(d+ex^r)^3\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^3\,\left(d+e\,x^r\right)^3\,\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^3*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int(x^3*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.394 $\int x(d+ex^r)^3 (a+b\log(cx^n))\,dx$

3.394.1 Optimal result

Integrand size = 21, antiderivative size = 149

$$\int x(d+ex^r)^3 (a+b\log(cx^n))\,dx = -\frac{1}{4}bd^3nx^2 - \frac{3bde^2nx^{2(1+r)}}{4(1+r)^2} - \frac{3bd^2enx^{2+r}}{(2+r)^2} - \frac{be^3nx^{2+3r}}{(2+3r)^2} + \frac{1}{2}\left(d^3x^2 + \frac{3de^2x^{2(1+r)}}{1+r} + \frac{6d^2ex^{2+r}}{2+r} + \frac{2e^3x^{2+3r}}{2+3r}\right)(a + b\log(cx^n))$$

output
```
-1/4*b*d^3*n*x^2-3/4*b*d*e^2*n*x^(2+2*r)/(1+r)^2-3*b*d^2*e*n*x^(2+r)/(2+r)
^2-b*e^3*n*x^(2+3*r)/(2+3*r)^2+1/2*(d^3*x^2+3*d*e^2*x^(2+2*r)/(1+r)+6*d^2*
e*x^(2+r)/(2+r)+2*e^3*x^(2+3*r)/(2+3*r))*(a+b*ln(c*x^n))
```

3.394.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 178, normalized size of antiderivative = 1.19

$$\int x(d+ex^r)^3 (a+b\log(cx^n))\,dx = \frac{1}{4}x^2\left(bn\left(-d^3 - \frac{12d^2ex^r}{(2+r)^2} - \frac{3de^2x^{2r}}{(1+r)^2} - \frac{4e^3x^{3r}}{(2+3r)^2}\right) + 2a\left(d^3 + \frac{6d^2ex^r}{2+r} + \frac{3de^2x^{2r}}{1+r} + \frac{2e^3x^{3r}}{2+3r}\right) + 2b\left(d^3 + \frac{6d^2ex^r}{2+r} + \frac{3de^2x^{2r}}{1+r} + \frac{2e^3x^{3r}}{2+3r}\right)\log(cx^n)\right)$$

input
```
Integrate[x*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^2*(b*n*(-d^3 - (12*d^2*e*x^r)/(2 + r)^2 - (3*d*e^2*x^(2*r))/(1 + r)^2 -
 (4*e^3*x^(3*r))/(2 + 3*r)^2) + 2*a*(d^3 + (6*d^2*e*x^r)/(2 + r) + (3*d*e^
2*x^(2*r))/(1 + r) + (2*e^3*x^(3*r))/(2 + 3*r)) + 2*b*(d^3 + (6*d^2*e*x^r)
/(2 + r) + (3*d*e^2*x^(2*r))/(1 + r) + (2*e^3*x^(3*r))/(2 + 3*r))*Log[c*x^
n]))/4
```

3.394.3 Rubi [A] (verified)

Time = 0.55 (sec) , antiderivative size = 148, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.190, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x(d+ex^r)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{2}\left(d^3x^2+\frac{6d^2ex^{r+2}}{r+2}+\frac{3de^2x^{2(r+1)}}{r+1}+\frac{2e^3x^{3r+2}}{3r+2}\right)(a+b\log(cx^n))-bn\int \frac{1}{2}x\left(\frac{6d^2ex^r}{r+2}+\frac{3de^2x^{2r}}{r+1}+\frac{2e^3x^{3r}}{3r+2}+d^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{2}\left(d^3x^2+\frac{6d^2ex^{r+2}}{r+2}+\frac{3de^2x^{2(r+1)}}{r+1}+\frac{2e^3x^{3r+2}}{3r+2}\right)(a+b\log(cx^n))-\frac{1}{2}bn\int x\left(\frac{6d^2ex^r}{r+2}+\frac{3de^2x^{2r}}{r+1}+\frac{2e^3x^{3r}}{3r+2}+d^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{2}\left(d^3x^2+\frac{6d^2ex^{r+2}}{r+2}+\frac{3de^2x^{2(r+1)}}{r+1}+\frac{2e^3x^{3r+2}}{3r+2}\right)(a+b\log(cx^n))-\frac{1}{2}bn\int \left(\frac{6d^2ex^{r+1}}{r+2}+\frac{3de^2x^{2r+1}}{r+1}+\frac{2e^3x^{3r+1}}{3r+2}+d^3x\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{2}\left(d^3x^2+\frac{6d^2ex^{r+2}}{r+2}+\frac{3de^2x^{2(r+1)}}{r+1}+\frac{2e^3x^{3r+2}}{3r+2}\right)(a+b\log(cx^n))-\frac{1}{2}bn\left(\frac{d^3x^2}{2}+\frac{6d^2ex^{r+2}}{(r+2)^2}+\frac{3de^2x^{2(r+1)}}{2(r+1)^2}+\frac{2e^3x^{3r+2}}{(3r+2)^2}\right)$$

input
```
Int[x*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/2*(b*n*((d^3*x^2)/2 + (3*d*e^2*x^(2*(1 + r)))/(2*(1 + r)^2) + (6*d^2*e*
x^(2 + r))/(2 + r)^2 + (2*e^3*x^(2 + 3*r))/(2 + 3*r)^2)) + ((d^3*x^2 + (3*
d*e^2*x^(2*(1 + r)))/(1 + r) + (6*d^2*e*x^(2 + r))/(2 + r) + (2*e^3*x^(2 +
 3*r))/(2 + 3*r))*(a + b*Log[c*x^n]))/2
```

3.394.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.394.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1266 vs. $2(143) = 286$.

Time = 5.65 (sec) , antiderivative size = 1267, normalized size of antiderivative = 8.50

method	result	size
parallelrisch	Expression too large to display	1267
risch	Expression too large to display	4027

input
```
int(x*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/4*(-18*x^2*a*d^3*r^6-132*x^2*a*d^3*r^5-386*x^2*a*d^3*r^4-576*x^2*a*d^3*
r^3-464*x^2*a*d^3*r^2-192*x^2*a*d^3*r-32*x^2*(x^r)^3*a*e^3-32*x^2*b*ln(c*x
^n)*d^3-32*a*d^3*x^2-80*x^2*(x^r)^3*a*e^3*r^4-204*x^2*(x^r)^3*a*e^3*r^3-24
8*x^2*(x^r)^3*a*e^3*r^2-144*x^2*(x^r)^3*a*e^3*r+16*x^2*(x^r)^3*b*e^3*n+66*
x^2*b*d^3*n*r^5+193*x^2*b*d^3*n*r^4+288*x^2*b*d^3*n*r^3+232*x^2*b*d^3*n*r^
2+96*x^2*b*d^3*n*r-18*x^2*ln(c*x^n)*b*d^3*r^6-132*x^2*ln(c*x^n)*b*d^3*r^5-
386*x^2*ln(c*x^n)*b*d^3*r^4-576*x^2*ln(c*x^n)*b*d^3*r^3-464*x^2*ln(c*x^n)*
b*d^3*r^2-192*x^2*ln(c*x^n)*b*d^3*r-96*x^2*x^r*a*d^2*e-96*x^2*(x^r)^2*a*d*
e^2-12*x^2*(x^r)^3*a*e^3*r^5+9*x^2*b*d^3*n*r^6-32*e^3*b*ln(c*x^n)*(x^r)^3*
x^2+16*b*d^3*n*x^2-108*x^2*x^r*ln(c*x^n)*b*d^2*e*r^5-576*x^2*x^r*ln(c*x^n)
*b*d^2*e*r^4-1164*x^2*x^r*ln(c*x^n)*b*d^2*e*r^3-1128*x^2*x^r*ln(c*x^n)*b*d
^2*e*r^2-528*x^2*x^r*ln(c*x^n)*b*d^2*e*r-54*x^2*(x^r)^2*ln(c*x^n)*b*d*e^2*
r^5-342*x^2*(x^r)^2*ln(c*x^n)*b*d*e^2*r^4-816*x^2*(x^r)^2*ln(c*x^n)*b*d*e^
2*r^3-912*x^2*(x^r)^2*ln(c*x^n)*b*d*e^2*r^2-480*x^2*(x^r)^2*ln(c*x^n)*b*d*
e^2*r+108*x^2*x^r*b*d^2*e*n*r^4+360*x^2*x^r*b*d^2*e*n*r^3+444*x^2*x^r*b*d^
2*e*n*r^2+240*x^2*x^r*b*d^2*e*n*r+27*x^2*(x^r)^2*b*d*e^2*n*r^4+144*x^2*(x^
r)^2*b*d*e^2*n*r^3+264*x^2*(x^r)^2*b*d*e^2*n*r^2-96*e*d^2*b*ln(c*x^n)*x^r*
x^2-96*e^2*d*b*ln(c*x^n)*(x^r)^2*x^2-12*x^2*(x^r)^3*ln(c*x^n)*b*e^3*r^5-80
*x^2*(x^r)^3*ln(c*x^n)*b*e^3*r^4-204*x^2*(x^r)^3*ln(c*x^n)*b*e^3*r^3-248*x
^2*(x^r)^3*ln(c*x^n)*b*e^3*r^2-144*x^2*(x^r)^3*ln(c*x^n)*b*e^3*r-108*x^...
```

3.394.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1024 vs. $2(143) = 286$.

Time = 0.34 (sec) , antiderivative size = 1024, normalized size of antiderivative = 6.87

$$\int x(d+ex^r)^3 (a+b\log(cx^n))\,dx$$
$$= \frac{2\left(9\,bd^3r^6+66\,bd^3r^5+193\,bd^3r^4+288\,bd^3r^3+232\,bd^3r^2+96\,bd^3r+16\,bd^3\right)x^2\log(c)+2\left(9\,bd^3nr^6+66\,b\right.}{}$$

input
```
integrate(x*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/4*(2*(9*b*d^3*r^6 + 66*b*d^3*r^5 + 193*b*d^3*r^4 + 288*b*d^3*r^3 + 232*b
*d^3*r^2 + 96*b*d^3*r + 16*b*d^3)*x^2*log(c) + 2*(9*b*d^3*n*r^6 + 66*b*d^3
*n*r^5 + 193*b*d^3*n*r^4 + 288*b*d^3*n*r^3 + 232*b*d^3*n*r^2 + 96*b*d^3*n*
r + 16*b*d^3*n)*x^2*log(x) - (9*(b*d^3*n - 2*a*d^3)*r^6 + 66*(b*d^3*n - 2*
a*d^3)*r^5 + 16*b*d^3*n + 193*(b*d^3*n - 2*a*d^3)*r^4 - 32*a*d^3 + 288*(b*
d^3*n - 2*a*d^3)*r^3 + 232*(b*d^3*n - 2*a*d^3)*r^2 + 96*(b*d^3*n - 2*a*d^3
)*r)*x^2 + 4*((3*b*e^3*r^5 + 20*b*e^3*r^4 + 51*b*e^3*r^3 + 62*b*e^3*r^2 +
36*b*e^3*r + 8*b*e^3)*x^2*log(c) + (3*b*e^3*n*r^5 + 20*b*e^3*n*r^4 + 51*b*
e^3*n*r^3 + 62*b*e^3*n*r^2 + 36*b*e^3*n*r + 8*b*e^3*n)*x^2*log(x) + (3*a*e
^3*r^5 - 4*b*e^3*n - (b*e^3*n - 20*a*e^3)*r^4 + 8*a*e^3 - 3*(2*b*e^3*n - 1
7*a*e^3)*r^3 - (13*b*e^3*n - 62*a*e^3)*r^2 - 12*(b*e^3*n - 3*a*e^3)*r)*x^2
)*x^(3*r) + 3*(2*(9*b*d*e^2*r^5 + 57*b*d*e^2*r^4 + 136*b*d*e^2*r^3 + 152*b
*d*e^2*r^2 + 80*b*d*e^2*r + 16*b*d*e^2)*x^2*log(c) + 2*(9*b*d*e^2*n*r^5 +
57*b*d*e^2*n*r^4 + 136*b*d*e^2*n*r^3 + 152*b*d*e^2*n*r^2 + 80*b*d*e^2*n*r
+ 16*b*d*e^2*n)*x^2*log(x) + (18*a*d*e^2*r^5 - 16*b*d*e^2*n - 3*(3*b*d*e^2
*n - 38*a*d*e^2)*r^4 + 32*a*d*e^2 - 16*(3*b*d*e^2*n - 17*a*d*e^2)*r^3 - 8*
(11*b*d*e^2*n - 38*a*d*e^2)*r^2 - 32*(2*b*d*e^2*n - 5*a*d*e^2)*r)*x^2)*x^(
2*r) + 12*((9*b*d^2*e*r^5 + 48*b*d^2*e*r^4 + 97*b*d^2*e*r^3 + 94*b*d^2*e*r
^2 + 44*b*d^2*e*r + 8*b*d^2*e)*x^2*log(c) + (9*b*d^2*e*n*r^5 + 48*b*d^2*e*
n*r^4 + 97*b*d^2*e*n*r^3 + 94*b*d^2*e*n*r^2 + 44*b*d^2*e*n*r + 8*b*d^2*...
```

3.394.6 Sympy [A] (verification not implemented)

Time = 86.83 (sec) , antiderivative size = 357, normalized size of antiderivative = 2.40

$$\int x(d+ex^r)^3\,(a+b\log{(cx^n)})\;dx$$
$$= \frac{ad^3x^2}{2} + 3ad^2e\left(\begin{cases}\frac{x^2x^r}{r+2} & \text{for}\ r\neq -2\\ x^2x^r\log{(x)} & \text{otherwise}\end{cases}\right) + 3ade^2\left(\begin{cases}\frac{x^2x^{2r}}{2r+2} & \text{for}\ r\neq -1\\ x^2x^{2r}\log{(x)} & \text{otherwise}\end{cases}\right)$$
$$+ ae^3\left(\begin{cases}\frac{x^2x^{3r}}{3r+2} & \text{for}\ r\neq -\frac{2}{3}\\ x^2x^{3r}\log{(x)} & \text{otherwise}\end{cases}\right) - \frac{bd^3nx^2}{4} + \frac{bd^3x^2\log{(cx^n)}}{2}$$
$$- 3bd^2en\left(\begin{cases}\frac{\begin{cases}\frac{x^{r+2}}{r+2} & \text{for}\ r\neq -2\\ \log{(x)} & \text{otherwise}\end{cases}}{r+2} & \text{for}\ r>-\infty\wedge r<\infty\wedge r\neq -2\\ \frac{\log{(x)}^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 3bd^2e\left(\begin{cases}\frac{x^{r+2}}{r+2} & \text{for}\ r\neq -2\\ \log{(x)} & \text{otherwise}\end{cases}\right)\log{(cx^n)}$$
$$- 3bde^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r+2}}{2r+2} & \text{for}\ r\neq -1\\ \log{(x)} & \text{otherwise}\end{cases}}{2r+2} & \text{for}\ r>-\infty\wedge r<\infty\wedge r\neq -1\\ \frac{\log{(x)}^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 3bde^2\left(\begin{cases}\frac{x^{2r+2}}{2r+2} & \text{for}\ r\neq -1\\ \log{(x)} & \text{otherwise}\end{cases}\right)\log{(cx^n)}$$
$$- be^3n\left(\begin{cases}\frac{\begin{cases}\frac{x^{3r+2}}{3r+2} & \text{for}\ r\neq -\frac{2}{3}\\ \log{(x)} & \text{otherwise}\end{cases}}{3r+2} & \text{for}\ r>-\infty\wedge r<\infty\wedge r\neq -\frac{2}{3}\\ \frac{\log{(x)}^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ be^3\left(\begin{cases}\frac{x^{3r+2}}{3r+2} & \text{for}\ r\neq -\frac{2}{3}\\ \log{(x)} & \text{otherwise}\end{cases}\right)\log{(cx^n)}$$

input
```
integrate(x*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x**2/2 + 3*a*d**2*e*Piecewise((x**2*x**r/(r + 2), Ne(r, -2)), (x**2
*x**r*log(x), True)) + 3*a*d*e**2*Piecewise((x**2*x**(2*r)/(2*r + 2), Ne(r
, -1)), (x**2*x**(2*r)*log(x), True)) + a*e**3*Piecewise((x**2*x**(3*r)/(3
*r + 2), Ne(r, -2/3)), (x**2*x**(3*r)*log(x), True)) - b*d**3*n*x**2/4 + b
*d**3*x**2*log(c*x**n)/2 - 3*b*d**2*e*n*Piecewise((Piecewise((x**(r + 2)/(
r + 2), Ne(r, -2)), (log(x), True))/(r + 2), (r > -oo) & (r < oo) & Ne(r,
-2)), (log(x)**2/2, True)) + 3*b*d**2*e*Piecewise((x**(r + 2)/(r + 2), Ne(
r, -2)), (log(x), True))*log(c*x**n) - 3*b*d*e**2*n*Piecewise((Piecewise((
x**(2*r + 2)/(2*r + 2), Ne(r, -1)), (log(x), True))/(2*r + 2), (r > -oo) &
 (r < oo) & Ne(r, -1)), (log(x)**2/2, True)) + 3*b*d*e**2*Piecewise((x**(2
*r + 2)/(2*r + 2), Ne(r, -1)), (log(x), True))*log(c*x**n) - b*e**3*n*Piec
ewise((Piecewise((x**(3*r + 2)/(3*r + 2), Ne(r, -2/3)), (log(x), True))/(3
*r + 2), (r > -oo) & (r < oo) & Ne(r, -2/3)), (log(x)**2/2, True)) + b*e**
3*Piecewise((x**(3*r + 2)/(3*r + 2), Ne(r, -2/3)), (log(x), True))*log(c*x
**n)
```

3.394.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 222, normalized size of antiderivative = 1.49

$$\begin{aligned}\int x(d+ex^r)^3\,(a+b\log{(cx^n)})\,\,dx = & -\frac{1}{4}\,bd^3nx^2+\frac{1}{2}\,bd^3x^2\log{(cx^n)}+\frac{1}{2}\,ad^3x^2 \\ & +\frac{be^3x^{3\,r+2}\log{(cx^n)}}{3\,r+2}+\frac{3\,bde^2x^{2\,r+2}\log{(cx^n)}}{2\,(r+1)} \\ & +\frac{3\,bd^2ex^{r+2}\log{(cx^n)}}{r+2}-\frac{be^3nx^{3\,r+2}}{(3\,r+2)^2} \\ & +\frac{ae^3x^{3\,r+2}}{3\,r+2}-\frac{3\,bde^2nx^{2\,r+2}}{4\,(r+1)^2}+\frac{3\,ade^2x^{2\,r+2}}{2\,(r+1)} \\ & -\frac{3\,bd^2enx^{r+2}}{(r+2)^2}+\frac{3\,ad^2ex^{r+2}}{r+2}\end{aligned}$$

input
```
integrate(x*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/4*b*d^3*n*x^2 + 1/2*b*d^3*x^2*log(c*x^n) + 1/2*a*d^3*x^2 + b*e^3*x^(3*r
 + 2)*log(c*x^n)/(3*r + 2) + 3/2*b*d*e^2*x^(2*r + 2)*log(c*x^n)/(r + 1) +
3*b*d^2*e*x^(r + 2)*log(c*x^n)/(r + 2) - b*e^3*n*x^(3*r + 2)/(3*r + 2)^2 +
 a*e^3*x^(3*r + 2)/(3*r + 2) - 3/4*b*d*e^2*n*x^(2*r + 2)/(r + 1)^2 + 3/2*a
*d*e^2*x^(2*r + 2)/(r + 1) - 3*b*d^2*e*n*x^(r + 2)/(r + 2)^2 + 3*a*d^2*e*x
^(r + 2)/(r + 2)
```

3.394.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1611 vs. 2(143) = 286.

Time = 0.37 (sec) , antiderivative size = 1611, normalized size of antiderivative = 10.81

$$\int x(d+ex^r)^3 (a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/4*(12*b*e^3*n*r^5*x^2*x^(3*r)*log(x) + 54*b*d*e^2*n*r^5*x^2*x^(2*r)*log(
x) + 108*b*d^2*e*n*r^5*x^2*x^r*log(x) + 18*b*d^3*n*r^6*x^2*log(x) - 9*b*d^
3*n*r^6*x^2 + 12*b*e^3*r^5*x^2*x^(3*r)*log(c) + 54*b*d*e^2*r^5*x^2*x^(2*r)
*log(c) + 108*b*d^2*e*r^5*x^2*x^r*log(c) + 18*b*d^3*r^6*x^2*log(c) + 80*b*
e^3*n*r^4*x^2*x^(3*r)*log(x) + 342*b*d*e^2*n*r^4*x^2*x^(2*r)*log(x) + 576*
b*d^2*e*n*r^4*x^2*x^r*log(x) + 132*b*d^3*n*r^5*x^2*log(x) - 4*b*e^3*n*r^4*
x^2*x^(3*r) + 12*a*e^3*r^5*x^2*x^(3*r) - 27*b*d*e^2*n*r^4*x^2*x^(2*r) + 54
*a*d*e^2*r^5*x^2*x^(2*r) - 108*b*d^2*e*n*r^4*x^2*x^r + 108*a*d^2*e*r^5*x^2
*x^r - 66*b*d^3*n*r^5*x^2 + 18*a*d^3*r^6*x^2 + 80*b*e^3*r^4*x^2*x^(3*r)*lo
g(c) + 342*b*d*e^2*r^4*x^2*x^(2*r)*log(c) + 576*b*d^2*e*r^4*x^2*x^r*log(c)
 + 132*b*d^3*r^5*x^2*log(c) + 204*b*e^3*n*r^3*x^2*x^(3*r)*log(x) + 816*b*d
*e^2*n*r^3*x^2*x^(2*r)*log(x) + 1164*b*d^2*e*n*r^3*x^2*x^r*log(x) + 386*b*
d^3*n*r^4*x^2*log(x) - 24*b*e^3*n*r^3*x^2*x^(3*r) + 80*a*e^3*r^4*x^2*x^(3*
r) - 144*b*d*e^2*n*r^3*x^2*x^(2*r) + 342*a*d*e^2*r^4*x^2*x^(2*r) - 360*b*d
^2*e*n*r^3*x^2*x^r + 576*a*d^2*e*r^4*x^2*x^r - 193*b*d^3*n*r^4*x^2 + 132*a
*d^3*r^5*x^2 + 204*b*e^3*r^3*x^2*x^(3*r)*log(c) + 816*b*d*e^2*r^3*x^2*x^(2
*r)*log(c) + 1164*b*d^2*e*r^3*x^2*x^r*log(c) + 386*b*d^3*r^4*x^2*log(c) +
248*b*e^3*n*r^2*x^2*x^(3*r)*log(x) + 912*b*d*e^2*n*r^2*x^2*x^(2*r)*log(x)
+ 1128*b*d^2*e*n*r^2*x^2*x^r*log(x) + 576*b*d^3*n*r^3*x^2*log(x) - 52*b*e^
3*n*r^2*x^2*x^(3*r) + 204*a*e^3*r^3*x^2*x^(3*r) - 264*b*d*e^2*n*r^2*x^2...
```

3.394.9 Mupad [F(-1)]

Timed out.

$$\int x(d+ex^r)^3 (a+b\log(cx^n))\,dx = \int x\,(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int(x*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.395 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx$

3.395.1 Optimal result

Integrand size = 23, antiderivative size = 152

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx = -\frac{3bd^2enx^r}{r^2}-\frac{3bde^2nx^{2r}}{4r^2}-\frac{be^3nx^{3r}}{9r^2}-\frac{1}{2}bd^3n\log^2(x)+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}+d^3\log(x)(a+b\log(cx^n))$$

output
```
-3*b*d^2*e*n*x^r/r^2-3/4*b*d*e^2*n*x^(2*r)/r^2-1/9*b*e^3*n*x^(3*r)/r^2-1/2
*b*d^3*n*ln(x)^2+3*d^2*e*x^r*(a+b*ln(c*x^n))/r+3/2*d*e^2*x^(2*r)*(a+b*ln(c
*x^n))/r+1/3*e^3*x^(3*r)*(a+b*ln(c*x^n))/r+d^3*ln(x)*(a+b*ln(c*x^n))
```

3.395.2 Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 132, normalized size of antiderivative = 0.87

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx = ad^3\log(x)+\frac{1}{36}\left(\frac{ex^r(6ar(18d^2+9dex^r+2e^2x^{2r})-bn(108d^2+27dex^r+4e^2x^{2r}))}{r^2}+\frac{6bex^r(18d^2+9dex^r+2e^2x^{2r})\log(cx^n)}{r}+\frac{18bd^3\log^2(cx^n)}{n}\right)$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
a*d^3*Log[x] + ((e*x^r*(6*a*r*(18*d^2 + 9*d*e*x^r + 2*e^2*x^(2*r)) - b*n*(
108*d^2 + 27*d*e*x^r + 4*e^2*x^(2*r))))/r^2 + (6*b*e*x^r*(18*d^2 + 9*d*e*x
^r + 2*e^2*x^(2*r))*Log[c*x^n])/r + (18*b*d^3*Log[c*x^n]^2)/n)/36
```

3.395.3 Rubi [A] (verified)

Time = 0.42 (sec) , antiderivative size = 153, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x} dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \frac{e(9dex^r+2e^2x^{2r}+18d^2)x^r+6d^3r\log(x)}{6rx}dx+d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{e(9dex^r+2e^2x^{2r}+18d^2)x^r+6d^3r\log(x)}{x}dx}{6r}+d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}$$

$$\Big\downarrow \text{2010}$$

$$-\frac{bn\int \left(18d^2ex^{r-1}+9de^2x^{2r-1}+2e^3x^{3r-1}+\frac{6d^3r\log(x)}{x}\right)dx}{6r}+d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}$$

$$\Big\downarrow \text{2009}$$

$$d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}-\frac{bn\left(3d^3r\log^2(x)+\frac{18d^2ex^r}{r}+\frac{9de^2x^{2r}}{2r}+\frac{2e^3x^{3r}}{3r}\right)}{6r}$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
-1/6*(b*n*((18*d^2*e*x^r)/r + (9*d*e^2*x^(2*r))/(2*r) + (2*e^3*x^(3*r))/(3
*r) + 3*d^3*r*Log[x]^2))/r + (3*d^2*e*x^r*(a + b*Log[c*x^n]))/r + (3*d*e^2
*x^(2*r)*(a + b*Log[c*x^n]))/(2*r) + (e^3*x^(3*r)*(a + b*Log[c*x^n]))/(3*r
) + d^3*Log[x]*(a + b*Log[c*x^n])
```

3.395.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.395.4 Maple [A] (verified)

Time = 3.32 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.16

method	result
parallelrisch	$\frac{12e^{3}b\ln(c\,x^{n})x^{3r}nr+12x^{3r}a\,e^{3}nr-4x^{3r}b\,e^{3}n^{2}+54bd\,e^{2}\ln(c\,x^{n})x^{2r}nr+36\ln(x)a\,d^{3}n\,r^{2}+54x^{2r}ad\,e^{2}nr-27x^{2r}bd\,e^{2}n^{2}+108b}{36n\,r^{2}}$
risch	$-\frac{3b\,d^{2}en\,x^{r}}{r^{2}}-\frac{3bd\,e^{2}n\,x^{2r}}{4r^{2}}-\frac{b\,e^{3}n\,x^{3r}}{9r^{2}}-\frac{i\ln(x)\pi b\,d^{3}\operatorname{csgn}(ic)\operatorname{csgn}(ix^{n})\operatorname{csgn}(ic\,x^{n})}{2}-\frac{i\pi b\,e^{3}\operatorname{csgn}(ic\,x^{n})^{3}x^{3r}}{6r}+\ln($

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/36*(12*e^3*b*ln(c*x^n)*(x^r)^3*n*r+12*(x^r)^3*a*e^3*n*r-4*(x^r)^3*b*e^3*
n^2+54*b*d*e^2*ln(c*x^n)*(x^r)^2*n*r+36*ln(x)*a*d^3*n*r^2+54*(x^r)^2*a*d*e
^2*n*r-27*(x^r)^2*b*d*e^2*n^2+108*b*d^2*e*ln(c*x^n)*x^r*n*r+18*b*d^3*ln(c*
x^n)^2*r^2+108*x^r*a*d^2*e*n*r-108*x^r*b*d^2*e*n^2)/n/r^2
```

3.395.5 Fricas [A] (verification not implemented)

Time = 0.35 (sec) , antiderivative size = 169, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx$$
$$= \frac{18\,bd^3nr^2\log(x)^2 + 4\,(3\,be^3nr\log(x) + 3\,be^3r\log(c) - be^3n + 3\,ae^3r)x^{3\,r} + 27\,(2\,bde^2nr\log(x) + 2\,bde^2r$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/36*(18*b*d^3*n*r^2*log(x)^2 + 4*(3*b*e^3*n*r*log(x) + 3*b*e^3*r*log(c) -
 b*e^3*n + 3*a*e^3*r)*x^(3*r) + 27*(2*b*d*e^2*n*r*log(x) + 2*b*d*e^2*r*log
(c) - b*d*e^2*n + 2*a*d*e^2*r)*x^(2*r) + 108*(b*d^2*e*n*r*log(x) + b*d^2*e
*r*log(c) - b*d^2*e*n + a*d^2*e*r)*x^r + 36*(b*d^3*r^2*log(c) + a*d^3*r^2)
*log(x))/r^2
```

3.395.6 Sympy [A] (verification not implemented)

Time = 2.91 (sec) , antiderivative size = 299, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx$$
$$= \begin{cases} (a+b\log(c))\,(d+e)^3\log(x) \\ (a+b\log(c))\left(d^3\log(x) + \frac{3d^2ex^r}{r} + \frac{3de^2x^{2r}}{2r} + \frac{e^3x^{3r}}{3r}\right) \\ (d+e)^3\left(\begin{cases} a\log(x) & \text{for } b=0 \\ -(-a-b\log(c))\log(x) & \text{for } n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right) \\ \frac{ad^3\log(cx^n)}{n} + \frac{3ad^2ex^r}{r} + \frac{3ade^2x^{2r}}{2r} + \frac{ae^3x^{3r}}{3r} + \frac{bd^3\log(cx^n)^2}{2n} - \frac{3bd^2enx^r}{r^2} + \frac{3bd^2ex^r\log(cx^n)}{r} - \frac{3bde^2nx^{2r}}{4r^2} + \frac{3bde^2x^{2r}\log(c}{2r} \end{cases}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise(((a + b*log(c))*(d + e)**3*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b
*log(c))*(d**3*log(x) + 3*d**2*e*x**r/r + 3*d*e**2*x**(2*r)/(2*r) + e**3*x
**(3*r)/(3*r)), Eq(n, 0)), ((d + e)**3*Piecewise((a*log(x), Eq(b, 0)), (-(
-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))
, Eq(r, 0)), (a*d**3*log(c*x**n)/n + 3*a*d**2*e*x**r/r + 3*a*d*e**2*x**(2*
r)/(2*r) + a*e**3*x**(3*r)/(3*r) + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*
e*n*x**r/r**2 + 3*b*d**2*e*x**r*log(c*x**n)/r - 3*b*d*e**2*n*x**(2*r)/(4*r
**2) + 3*b*d*e**2*x**(2*r)*log(c*x**n)/(2*r) - b*e**3*n*x**(3*r)/(9*r**2)
+ b*e**3*x**(3*r)*log(c*x**n)/(3*r), True))
```

3.395.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 172, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx = \frac{be^3x^{3r}\log(cx^n)}{3r} + \frac{3bde^2x^{2r}\log(cx^n)}{2r} + \frac{3bd^2ex^r\log(cx^n)}{r} + \frac{bd^3\log(cx^n)^2}{2n} + ad^3\log(x) - \frac{be^3nx^{3r}}{9r^2} + \frac{ae^3x^{3r}}{3r} - \frac{3bde^2nx^{2r}}{4r^2} + \frac{3ade^2x^{2r}}{2r} - \frac{3bd^2enx^r}{r^2} + \frac{3ad^2ex^r}{r}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/3*b*e^3*x^(3*r)*log(c*x^n)/r + 3/2*b*d*e^2*x^(2*r)*log(c*x^n)/r + 3*b*d^
2*e*x^r*log(c*x^n)/r + 1/2*b*d^3*log(c*x^n)^2/n + a*d^3*log(x) - 1/9*b*e^3
*n*x^(3*r)/r^2 + 1/3*a*e^3*x^(3*r)/r - 3/4*b*d*e^2*n*x^(2*r)/r^2 + 3/2*a*d
*e^2*x^(2*r)/r - 3*b*d^2*e*n*x^r/r^2 + 3*a*d^2*e*x^r/r
```

3.395.8 Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^r+d)^3(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x, x)
```

3.395.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x} \, dx = \int \frac{(d+e\,x^r)^3 \,(a+b\,\ln(c\,x^n))}{x} \, dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x, x)
```

3.396 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^3}\,dx$

3.396.1 Optimal result

Integrand size = 23, antiderivative size = 191

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^3}\,dx = -\frac{bd^3n}{4x^2}-\frac{3bde^2nx^{-2(1-r)}}{4(1-r)^2}-\frac{3bd^2enx^{-2+r}}{(2-r)^2}-\frac{be^3nx^{-2+3r}}{(2-3r)^2}-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3de^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{3d^2ex^{-2+r}(a+b\log(cx^n))}{2-r}-\frac{e^3x^{-2+3r}(a+b\log(cx^n))}{2-3r}$$

output
```
-1/4*b*d^3*n/x^2-3/4*b*d*e^2*n/(1-r)^2/(x^(2-2*r))-3*b*d^2*e*n*x^(-2+r)/(2
-r)^2-b*e^3*n*x^(-2+3*r)/(2-3*r)^2-1/2*d^3*(a+b*ln(c*x^n))/x^2-3/2*d*e^2*(
a+b*ln(c*x^n))/(1-r)/(x^(2-2*r))-3*d^2*e*x^(-2+r)*(a+b*ln(c*x^n))/(2-r)-e^
3*x^(-2+3*r)*(a+b*ln(c*x^n))/(2-3*r)
```

3.396.2 Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 181, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^3}\,dx = \frac{bn\left(-d^3-\frac{12d^2ex^r}{(-2+r)^2}-\frac{3de^2x^{2r}}{(-1+r)^2}-\frac{4e^3x^{3r}}{(2-3r)^2}\right)+a\left(-2d^3+\frac{12d^2ex^r}{-2+r}+\frac{6de^2x^{2r}}{-1+r}+\frac{4e^3x^{3r}}{-2+3r}\right)+2b\left(-d^3+\frac{6d^2ex^r}{-2+r}+\frac{3de^2x^{2r}}{-1+r}\right.}{4x^2}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-d^3 - (12*d^2*e*x^r)/(-2 + r)^2 - (3*d*e^2*x^(2*r))/(-1 + r)^2 - (4
*e^3*x^(3*r))/(2 - 3*r)^2) + a*(-2*d^3 + (12*d^2*e*x^r)/(-2 + r) + (6*d*e^
2*x^(2*r))/(-1 + r) + (4*e^3*x^(3*r))/(-2 + 3*r)) + 2*b*(-d^3 + (6*d^2*e*x
^r)/(-2 + r) + (3*d*e^2*x^(2*r))/(-1 + r) + (2*e^3*x^(3*r))/(-2 + 3*r))*Lo
g[c*x^n])/(4*x^2)
```

3.396.3 Rubi [A] (verified)

Time = 0.64 (sec) , antiderivative size = 190, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^3}\,dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int -\frac{\frac{6d^2ex^r}{2-r}+\frac{3de^2x^{2r}}{1-r}+\frac{2e^3x^{3r}}{2-3r}+d^3}{2x^3}dx-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2ex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{3de^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{e^3x^{3r-2}(a+b\log(cx^n))}{2-3r}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{2}bn\int \frac{\frac{6d^2ex^r}{2-r}+\frac{3de^2x^{2r}}{1-r}+\frac{2e^3x^{3r}}{2-3r}+d^3}{x^3}dx-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2ex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{3de^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{e^3x^{3r-2}(a+b\log(cx^n))}{2-3r}$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{1}{2}bn\int \left(-\frac{6d^2ex^{r-3}}{r-2}+\frac{2e^3x^{3(r-1)}}{2-3r}-\frac{3de^2x^{2r-3}}{r-1}+\frac{d^3}{x^3}\right)dx-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2ex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{3de^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{e^3x^{3r-2}(a+b\log(cx^n))}{2-3r}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{2x^2}-\frac{3d^2ex^{r-2}(a+b\log(cx^n))}{2-r}-\frac{3de^2x^{-2(1-r)}(a+b\log(cx^n))}{2(1-r)}-\frac{e^3x^{3r-2}(a+b\log(cx^n))}{2-3r}+\frac{1}{2}bn\left(-\frac{d^3}{2x^2}-\frac{6d^2ex^{r-2}}{(2-r)^2}-\frac{3de^2x^{-2(1-r)}}{2(1-r)^2}-\frac{2e^3x^{3r-2}}{(2-3r)^2}\right)$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^3,x]
```

output
```
(b*n*(-1/2*d^3/x^2 - (3*d*e^2)/(2*(1 - r)^2*x^(2*(1 - r))) - (6*d^2*e*x^(-
2 + r))/(2 - r)^2 - (2*e^3*x^(-2 + 3*r))/(2 - 3*r)^2))/2 - (d^3*(a + b*Log
[c*x^n]))/(2*x^2) - (3*d*e^2*(a + b*Log[c*x^n]))/(2*(1 - r)*x^(2*(1 - r)))
 - (3*d^2*e*x^(-2 + r)*(a + b*Log[c*x^n]))/(2 - r) - (e^3*x^(-2 + 3*r)*(a
+ b*Log[c*x^n]))/(2 - 3*r)
```

3.396.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.396. $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^3}\,dx$

3.396.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1038 vs. $2(183) = 366$.

Time = 3.59 (sec) , antiderivative size = 1039, normalized size of antiderivative = 5.44

method	result	size
parallelrisch	Expression too large to display	1039
risch	Expression too large to display	4027

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^3,x,method=_RETURNVERBOSE)
```

output
```
-1/4*(32*b*ln(c*x^n)*d^3+96*b*d*e^2*ln(c*x^n)*(x^r)^2+32*e^3*(x^r)^3*a-288
*b*d^3*n*r^3+232*b*d^3*n*r^2-96*b*d^3*n*r+912*a*d*e^2*r^2*(x^r)^2-816*a*d*
e^2*r^3*(x^r)^2+96*d*e^2*(x^r)^2*a+96*d^2*e*x^r*a+32*a*d^3-204*a*e^3*r^3*(
x^r)^3+248*a*e^3*r^2*(x^r)^3-144*a*e^3*r*(x^r)^3-12*a*e^3*r^5*(x^r)^3+80*a
*e^3*r^4*(x^r)^3-12*(x^r)^3*ln(c*x^n)*b*e^3*r^5+80*(x^r)^3*ln(c*x^n)*b*e^3
*r^4-204*(x^r)^3*ln(c*x^n)*b*e^3*r^3+248*(x^r)^3*ln(c*x^n)*b*e^3*r^2-144*(
x^r)^3*ln(c*x^n)*b*e^3*r+96*b*d^2*e*ln(c*x^n)*x^r+9*b*d^3*n*r^6-66*b*d^3*n
*r^5+193*b*d^3*n*r^4-108*x^r*ln(c*x^n)*b*d^2*e*r^5+576*x^r*ln(c*x^n)*b*d^2
*e*r^4-1164*x^r*ln(c*x^n)*b*d^2*e*r^3+1128*x^r*ln(c*x^n)*b*d^2*e*r^2-528*x
^r*ln(c*x^n)*b*d^2*e*r-54*(x^r)^2*ln(c*x^n)*b*d*e^2*r^5+342*(x^r)^2*ln(c*x
^n)*b*d*e^2*r^4-816*(x^r)^2*ln(c*x^n)*b*d*e^2*r^3+912*(x^r)^2*ln(c*x^n)*b*
d*e^2*r^2-480*(x^r)^2*ln(c*x^n)*b*d*e^2*r+16*b*d^3*n+18*ln(c*x^n)*b*d^3*r^
6-132*ln(c*x^n)*b*d^3*r^5+386*ln(c*x^n)*b*d^3*r^4-576*ln(c*x^n)*b*d^3*r^3+
464*ln(c*x^n)*b*d^3*r^2-192*ln(c*x^n)*b*d^3*r+32*e^3*b*ln(c*x^n)*(x^r)^3-5
76*a*d^3*r^3+464*a*d^3*r^2-192*a*d^3*r+18*a*d^3*r^6-132*a*d^3*r^5+386*a*d^
3*r^4-1164*a*d^2*e*r^3*x^r+48*b*d*e^2*n*(x^r)^2+48*b*d^2*e*n*x^r+16*b*e^3*
n*(x^r)^3-24*b*e^3*n*r^3*(x^r)^3+52*b*e^3*n*r^2*(x^r)^3-48*b*e^3*n*r*(x^r)
^3+1128*a*d^2*e*r^2*x^r+576*a*d^2*e*r^4*x^r-528*a*d^2*e*r*x^r+4*b*e^3*n*r^
4*(x^r)^3-480*a*d*e^2*r*(x^r)^2-54*a*d*e^2*r^5*(x^r)^2+342*a*d*e^2*r^4*(x^
r)^2-108*a*d^2*e*r^5*x^r+264*b*d*e^2*n*r^2*(x^r)^2+444*b*d^2*e*n*r^2*x^...
```

3.396.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 981 vs. $2(174) = 348$.

Time = 0.36 (sec) , antiderivative size = 981, normalized size of antiderivative = 5.14

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^3}\,dx = -\frac{9\,(bd^3n+2\,ad^3)r^6-66\,(bd^3n+2\,ad^3)r^5+16\,bd^3n+193\,(bd^3n+2\,ad^3)r^4+32\,ad^3-288\,(bd^3n+2\,ad^3}{}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^3,x, algorithm="fricas")
```

output
```
-1/4*(9*(b*d^3*n + 2*a*d^3)*r^6 - 66*(b*d^3*n + 2*a*d^3)*r^5 + 16*b*d^3*n
+ 193*(b*d^3*n + 2*a*d^3)*r^4 + 32*a*d^3 - 288*(b*d^3*n + 2*a*d^3)*r^3 + 2
32*(b*d^3*n + 2*a*d^3)*r^2 - 96*(b*d^3*n + 2*a*d^3)*r - 4*(3*a*e^3*r^5 - 4
*b*e^3*n - (b*e^3*n + 20*a*e^3)*r^4 - 8*a*e^3 + 3*(2*b*e^3*n + 17*a*e^3)*r
^3 - (13*b*e^3*n + 62*a*e^3)*r^2 + 12*(b*e^3*n + 3*a*e^3)*r + (3*b*e^3*r^5
 - 20*b*e^3*r^4 + 51*b*e^3*r^3 - 62*b*e^3*r^2 + 36*b*e^3*r - 8*b*e^3)*log(
c) + (3*b*e^3*n*r^5 - 20*b*e^3*n*r^4 + 51*b*e^3*n*r^3 - 62*b*e^3*n*r^2 + 3
6*b*e^3*n*r - 8*b*e^3*n)*log(x))*x^(3*r) - 3*(18*a*d*e^2*r^5 - 16*b*d*e^2*
n - 3*(3*b*d*e^2*n + 38*a*d*e^2)*r^4 - 32*a*d*e^2 + 16*(3*b*d*e^2*n + 17*a
*d*e^2)*r^3 - 8*(11*b*d*e^2*n + 38*a*d*e^2)*r^2 + 32*(2*b*d*e^2*n + 5*a*d*
e^2)*r + 2*(9*b*d*e^2*r^5 - 57*b*d*e^2*r^4 + 136*b*d*e^2*r^3 - 152*b*d*e^2
*r^2 + 80*b*d*e^2*r - 16*b*d*e^2)*log(c) + 2*(9*b*d*e^2*n*r^5 - 57*b*d*e^2
*n*r^4 + 136*b*d*e^2*n*r^3 - 152*b*d*e^2*n*r^2 + 80*b*d*e^2*n*r - 16*b*d*e
^2*n)*log(x))*x^(2*r) - 12*(9*a*d^2*e*r^5 - 4*b*d^2*e*n - 3*(3*b*d^2*e*n +
 16*a*d^2*e)*r^4 - 8*a*d^2*e + (30*b*d^2*e*n + 97*a*d^2*e)*r^3 - (37*b*d^2
*e*n + 94*a*d^2*e)*r^2 + 4*(5*b*d^2*e*n + 11*a*d^2*e)*r + (9*b*d^2*e*r^5 -
 48*b*d^2*e*r^4 + 97*b*d^2*e*r^3 - 94*b*d^2*e*r^2 + 44*b*d^2*e*r - 8*b*d^2
*e)*log(c) + (9*b*d^2*e*n*r^5 - 48*b*d^2*e*n*r^4 + 97*b*d^2*e*n*r^3 - 94*b
*d^2*e*n*r^2 + 44*b*d^2*e*n*r - 8*b*d^2*e*n)*log(x))*x^r + 2*(9*b*d^3*r^6
- 66*b*d^3*r^5 + 193*b*d^3*r^4 - 288*b*d^3*r^3 + 232*b*d^3*r^2 - 96*b*d...
```

3.396.6 Sympy [A] (verification not implemented)

Time = 46.14 (sec) , antiderivative size = 347, normalized size of antiderivative = 1.82

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^3}\,dx$$
$$= -\frac{ad^3}{2x^2} + 3ad^2e\left(\begin{cases}\frac{x^r}{rx^2-2x^2} & \text{for } r\neq 2\\ \frac{x^r\log(x)}{x^2} & \text{otherwise}\end{cases}\right) + 3ade^2\left(\begin{cases}\frac{x^{2r}}{2rx^2-2x^2} & \text{for } r\neq 1\\ \frac{x^{2r}\log(x)}{x^2} & \text{otherwise}\end{cases}\right)$$
$$+ ae^3\left(\begin{cases}\frac{x^{3r}}{3rx^2-2x^2} & \text{for } r\neq \frac{2}{3}\\ \frac{x^{3r}\log(x)}{x^2} & \text{otherwise}\end{cases}\right) - \frac{bd^3n}{4x^2} - \frac{bd^3\log(cx^n)}{2x^2}$$
$$- 3bd^2en\left(\begin{cases}\frac{\begin{cases}\frac{x^{r-2}}{r-2} & \text{for } r\neq 2\\ \log(x) & \text{otherwise}\end{cases}}{r-2} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq 2\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 3bd^2e\left(\begin{cases}\frac{x^{r-2}}{r-2} & \text{for } r\neq 2\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$
$$- 3bde^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r-2}}{2r-2} & \text{for } r\neq 1\\ \log(x) & \text{otherwise}\end{cases}}{2r-2} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq 1\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 3bde^2\left(\begin{cases}\frac{x^{2r-2}}{2r-2} & \text{for } r\neq 1\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$
$$- be^3n\left(\begin{cases}\frac{\begin{cases}\frac{x^{3r-2}}{3r-2} & \text{for } r\neq \frac{2}{3}\\ \log(x) & \text{otherwise}\end{cases}}{3r-2} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq \frac{2}{3}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ be^3\left(\begin{cases}\frac{x^{3r-2}}{3r-2} & \text{for } r\neq \frac{2}{3}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**3,x)
```

output
```
-a*d**3/(2*x**2) + 3*a*d**2*e*Piecewise((x**r/(r*x**2 - 2*x**2), Ne(r, 2))
, (x**r*log(x)/x**2, True)) + 3*a*d*e**2*Piecewise((x**(2*r)/(2*r*x**2 - 2
*x**2), Ne(r, 1)), (x**(2*r)*log(x)/x**2, True)) + a*e**3*Piecewise((x**(3
*r)/(3*r*x**2 - 2*x**2), Ne(r, 2/3)), (x**(3*r)*log(x)/x**2, True)) - b*d*
*3*n/(4*x**2) - b*d**3*log(c*x**n)/(2*x**2) - 3*b*d**2*e*n*Piecewise((Piec
ewise((x**(r - 2)/(r - 2), Ne(r, 2)), (log(x), True))/(r - 2), (r > -oo) &
 (r < oo) & Ne(r, 2)), (log(x)**2/2, True)) + 3*b*d**2*e*Piecewise((x**(r
- 2)/(r - 2), Ne(r, 2)), (log(x), True))*log(c*x**n) - 3*b*d*e**2*n*Piecew
ise((Piecewise((x**(2*r - 2)/(2*r - 2), Ne(r, 1)), (log(x), True))/(2*r -
2), (r > -oo) & (r < oo) & Ne(r, 1)), (log(x)**2/2, True)) + 3*b*d*e**2*Pi
ecewise((x**(2*r - 2)/(2*r - 2), Ne(r, 1)), (log(x), True))*log(c*x**n) -
b*e**3*n*Piecewise((Piecewise((x**(3*r - 2)/(3*r - 2), Ne(r, 2/3)), (log(x
), True))/(3*r - 2), (r > -oo) & (r < oo) & Ne(r, 2/3)), (log(x)**2/2, Tru
e)) + b*e**3*Piecewise((x**(3*r - 2)/(3*r - 2), Ne(r, 2/3)), (log(x), True
))*log(c*x**n)
```

3.396.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^3}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^3,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-3>0)', see `assume?` for more
details)Is
```

3.396.8 Giac [F]

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^3}\,dx = \int \frac{(ex^r+d)^3(b\log(cx^n)+a)}{x^3}\,dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^3,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^3, x)
```

3.396.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^3}\,dx = \int \frac{(d+e\,x^r)^3 \left(a+b\,\ln\left(c\,x^n\right)\right)}{x^3}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^3,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^3, x)
```

3.397 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^5}\,dx$

3.397.1 Optimal result

Integrand size = 23, antiderivative size = 191

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^5}\,dx = -\frac{bd^3n}{16x^4}-\frac{3bde^2nx^{-2(2-r)}}{4(2-r)^2}-\frac{3bd^2enx^{-4+r}}{(4-r)^2}-\frac{be^3nx^{-4+3r}}{(4-3r)^2} -\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3de^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)} -\frac{3d^2ex^{-4+r}(a+b\log(cx^n))}{4-r}-\frac{e^3x^{-4+3r}(a+b\log(cx^n))}{4-3r}$$

output
```
-1/16*b*d^3*n/x^4-3/4*b*d*e^2*n/(2-r)^2/(x^(4-2*r))-3*b*d^2*e*n*x^(-4+r)/(
4-r)^2-b*e^3*n*x^(-4+3*r)/(4-3*r)^2-1/4*d^3*(a+b*ln(c*x^n))/x^4-3/2*d*e^2*
(a+b*ln(c*x^n))/(2-r)/(x^(4-2*r))-3*d^2*e*x^(-4+r)*(a+b*ln(c*x^n))/(4-r)-e
^3*x^(-4+3*r)*(a+b*ln(c*x^n))/(4-3*r)
```

3.397.2 Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 181, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^5}\,dx$$
$$= \frac{bn\left(-d^3-\frac{48d^2ex^r}{(-4+r)^2}-\frac{12de^2x^{2r}}{(-2+r)^2}-\frac{16e^3x^{3r}}{(4-3r)^2}\right)+a\left(-4d^3+\frac{48d^2ex^r}{-4+r}+\frac{24de^2x^{2r}}{-2+r}+\frac{16e^3x^{3r}}{-4+3r}\right)+4b\left(-d^3+\frac{12d^2ex^r}{-4+r}+\frac{6d\cdots}{-\cdots}\right.}{16x^4}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-d^3 - (48*d^2*e*x^r)/(-4 + r)^2 - (12*d*e^2*x^(2*r))/(-2 + r)^2 - (
16*e^3*x^(3*r))/(4 - 3*r)^2) + a*(-4*d^3 + (48*d^2*e*x^r)/(-4 + r) + (24*d
*e^2*x^(2*r))/(-2 + r) + (16*e^3*x^(3*r))/(-4 + 3*r)) + 4*b*(-d^3 + (12*d^
2*e*x^r)/(-4 + r) + (6*d*e^2*x^(2*r))/(-2 + r) + (4*e^3*x^(3*r))/(-4 + 3*r
))*Log[c*x^n])/(16*x^4)
```

3.397.3 Rubi [A] (verified)

Time = 0.63 (sec) , antiderivative size = 188, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^5}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{12d^2ex^r}{4-r}+\frac{6de^2x^{2r}}{2-r}+\frac{4e^3x^{3r}}{4-3r}+d^3}{4x^5}dx-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2ex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{3de^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-\frac{e^3x^{3r-4}(a+b\log(cx^n))}{4-3r}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{4}bn\int \frac{\frac{12d^2ex^r}{4-r}+\frac{6de^2x^{2r}}{2-r}+\frac{4e^3x^{3r}}{4-3r}+d^3}{x^5}dx-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2ex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{3de^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-\frac{e^3x^{3r-4}(a+b\log(cx^n))}{4-3r}$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{4}bn\int \left(-\frac{12d^2ex^{r-5}}{r-4}-\frac{6de^2x^{2r-5}}{r-2}-\frac{4e^3x^{3r-5}}{3r-4}+\frac{d^3}{x^5}\right)dx-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2ex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{3de^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-\frac{e^3x^{3r-4}(a+b\log(cx^n))}{4-3r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{4x^4}-\frac{3d^2ex^{r-4}(a+b\log(cx^n))}{4-r}-\frac{3de^2x^{-2(2-r)}(a+b\log(cx^n))}{2(2-r)}-\frac{e^3x^{3r-4}(a+b\log(cx^n))}{4-3r}+\frac{1}{4}bn\left(-\frac{d^3}{4x^4}-\frac{12d^2ex^{r-4}}{(4-r)^2}-\frac{3de^2x^{-2(2-r)}}{(2-r)^2}-\frac{4e^3x^{3r-4}}{(4-3r)^2}\right)$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^5,x]
```

output
```
(b*n*(-1/4*d^3/x^4 - (3*d*e^2)/((2 - r)^2*x^(2*(2 - r))) - (12*d^2*e*x^(-4
 + r))/(4 - r)^2 - (4*e^3*x^(-4 + 3*r))/(4 - 3*r)^2))/4 - (d^3*(a + b*Log[
c*x^n]))/(4*x^4) - (3*d*e^2*(a + b*Log[c*x^n]))/(2*(2 - r)*x^(2*(2 - r)))
- (3*d^2*e*x^(-4 + r)*(a + b*Log[c*x^n]))/(4 - r) - (e^3*x^(-4 + 3*r)*(a +
 b*Log[c*x^n]))/(4 - 3*r)
```

3.397.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.397.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1038 vs. $2(183) = 366$.

Time = 3.44 (sec) , antiderivative size = 1039, normalized size of antiderivative = 5.44

method	result	size
parallelrisch	Expression too large to display	1039
risch	Expression too large to display	4027

input

```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^5,x,method=_RETURNVERBOSE)
```

output

```
-1/16*(4096*b*ln(c*x^n)*d^3+12288*b*d*e^2*ln(c*x^n)*(x^r)^2+4096*e^3*(x^r)
^3*a-2304*b*d^3*n*r^3+3712*b*d^3*n*r^2-3072*b*d^3*n*r+29184*a*d*e^2*r^2*(x
^r)^2-13056*a*d*e^2*r^3*(x^r)^2+12288*d*e^2*(x^r)^2*a+12288*d^2*e*x^r*a+40
96*a*d^3-3264*a*e^3*r^3*(x^r)^3+7936*a*e^3*r^2*(x^r)^3-9216*a*e^3*r*(x^r)^
3-48*a*e^3*r^5*(x^r)^3+640*a*e^3*r^4*(x^r)^3-48*(x^r)^3*ln(c*x^n)*b*e^3*r^
5+640*(x^r)^3*ln(c*x^n)*b*e^3*r^4-3264*(x^r)^3*ln(c*x^n)*b*e^3*r^3+7936*(x
^r)^3*ln(c*x^n)*b*e^3*r^2-9216*(x^r)^3*ln(c*x^n)*b*e^3*r+12288*b*d^2*e*ln(
c*x^n)*x^r+9*b*d^3*n*r^6-132*b*d^3*n*r^5+772*b*d^3*n*r^4-432*x^r*ln(c*x^n)
*b*d^2*e*r^5+4608*x^r*ln(c*x^n)*b*d^2*e*r^4-18624*x^r*ln(c*x^n)*b*d^2*e*r^
3+36096*x^r*ln(c*x^n)*b*d^2*e*r^2-33792*x^r*ln(c*x^n)*b*d^2*e*r-216*(x^r)^
2*ln(c*x^n)*b*d*e^2*r^5+2736*(x^r)^2*ln(c*x^n)*b*d*e^2*r^4-13056*(x^r)^2*l
n(c*x^n)*b*d*e^2*r^3+29184*(x^r)^2*ln(c*x^n)*b*d*e^2*r^2-30720*(x^r)^2*ln(
c*x^n)*b*d*e^2*r+1024*b*d^3*n+36*ln(c*x^n)*b*d^3*r^6-528*ln(c*x^n)*b*d^3*r
^5+3088*ln(c*x^n)*b*d^3*r^4-9216*ln(c*x^n)*b*d^3*r^3+14848*ln(c*x^n)*b*d^3
*r^2-12288*ln(c*x^n)*b*d^3*r+4096*e^3*b*ln(c*x^n)*(x^r)^3-9216*a*d^3*r^3+1
4848*a*d^3*r^2-12288*a*d^3*r+36*a*d^3*r^6-528*a*d^3*r^5+3088*a*d^3*r^4-186
24*a*d^2*e*r^3*x^r+3072*b*d*e^2*n*(x^r)^2+3072*b*d^2*e*n*x^r+1024*b*e^3*n*
(x^r)^3-192*b*e^3*n*r^3*(x^r)^3+832*b*e^3*n*r^2*(x^r)^3-1536*b*e^3*n*r*(x^
r)^3+36096*a*d^2*e*r^2*x^r+4608*a*d^2*e*r^4*x^r-33792*a*d^2*e*r*x^r+16*b*e
^3*n*r^4*(x^r)^3-30720*a*d*e^2*r*(x^r)^2-216*a*d*e^2*r^5*(x^r)^2+2736*a...
```

3.397.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 980 vs. $2(174) = 348$.

Time = 0.32 (sec) , antiderivative size = 980, normalized size of antiderivative = 5.13

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^5}\,dx =$$
$$-\frac{9\,(bd^3n+4\,ad^3)r^6-132\,(bd^3n+4\,ad^3)r^5+1024\,bd^3n+772\,(bd^3n+4\,ad^3)r^4+4096\,ad^3-2304\,(bd^3n}{}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^5,x, algorithm="fricas")
```

output
```
-1/16*(9*(b*d^3*n + 4*a*d^3)*r^6 - 132*(b*d^3*n + 4*a*d^3)*r^5 + 1024*b*d^
3*n + 772*(b*d^3*n + 4*a*d^3)*r^4 + 4096*a*d^3 - 2304*(b*d^3*n + 4*a*d^3)*
r^3 + 3712*(b*d^3*n + 4*a*d^3)*r^2 - 3072*(b*d^3*n + 4*a*d^3)*r - 16*(3*a*
e^3*r^5 - 64*b*e^3*n - (b*e^3*n + 40*a*e^3)*r^4 - 256*a*e^3 + 12*(b*e^3*n
+ 17*a*e^3)*r^3 - 4*(13*b*e^3*n + 124*a*e^3)*r^2 + 96*(b*e^3*n + 6*a*e^3)*
r + (3*b*e^3*r^5 - 40*b*e^3*r^4 + 204*b*e^3*r^3 - 496*b*e^3*r^2 + 576*b*e^
3*r - 256*b*e^3)*log(c) + (3*b*e^3*n*r^5 - 40*b*e^3*n*r^4 + 204*b*e^3*n*r^
3 - 496*b*e^3*n*r^2 + 576*b*e^3*n*r - 256*b*e^3*n)*log(x))*x^(3*r) - 12*(1
8*a*d*e^2*r^5 - 256*b*d*e^2*n - 3*(3*b*d*e^2*n + 76*a*d*e^2)*r^4 - 1024*a*
d*e^2 + 32*(3*b*d*e^2*n + 34*a*d*e^2)*r^3 - 32*(11*b*d*e^2*n + 76*a*d*e^2)
*r^2 + 512*(b*d*e^2*n + 5*a*d*e^2)*r + 2*(9*b*d*e^2*r^5 - 114*b*d*e^2*r^4
+ 544*b*d*e^2*r^3 - 1216*b*d*e^2*r^2 + 1280*b*d*e^2*r - 512*b*d*e^2)*log(c
) + 2*(9*b*d*e^2*n*r^5 - 114*b*d*e^2*n*r^4 + 544*b*d*e^2*n*r^3 - 1216*b*d*
e^2*n*r^2 + 1280*b*d*e^2*n*r - 512*b*d*e^2*n)*log(x))*x^(2*r) - 48*(9*a*d^
2*e*r^5 - 64*b*d^2*e*n - 3*(3*b*d^2*e*n + 32*a*d^2*e)*r^4 - 256*a*d^2*e +
4*(15*b*d^2*e*n + 97*a*d^2*e)*r^3 - 4*(37*b*d^2*e*n + 188*a*d^2*e)*r^2 + 3
2*(5*b*d^2*e*n + 22*a*d^2*e)*r + (9*b*d^2*e*r^5 - 96*b*d^2*e*r^4 + 388*b*d
^2*e*r^3 - 752*b*d^2*e*r^2 + 704*b*d^2*e*r - 256*b*d^2*e)*log(c) + (9*b*d^
2*e*n*r^5 - 96*b*d^2*e*n*r^4 + 388*b*d^2*e*n*r^3 - 752*b*d^2*e*n*r^2 + 704
*b*d^2*e*n*r - 256*b*d^2*e*n)*log(x))*x^r + 4*(9*b*d^3*r^6 - 132*b*d^3*...
```

3.397.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^5}\,dx = \text{Timed out}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**5,x)
```

output
```
Timed out
```

3.397.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^5}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^5,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-5>0)', see `assume?` for more
details)Is
```

3.397.8 Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^5}\,dx = \int \frac{(ex^r+d)^3(b\log(cx^n)+a)}{x^5}\,dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^5,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^5, x)
```

3.397.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3\,(a+b\log{(cx^n)})}{x^5}\,dx = \int \frac{(d+e\,x^r)^3\,(a+b\,\ln{(c\,x^n)})}{x^5}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^5,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^5, x)
```

3.398 $\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx$

3.398.1 Optimal result

Integrand size = 23, antiderivative size = 151

$$\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx = -\frac{1}{25}bd^3nx^5-\frac{3bd^2enx^{5+r}}{(5+r)^2}-\frac{3bde^2nx^{5+2r}}{(5+2r)^2}-\frac{be^3nx^{5+3r}}{(5+3r)^2}+\frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{5+r}}{5+r}+\frac{15de^2x^{5+2r}}{5+2r}+\frac{5e^3x^{5+3r}}{5+3r}\right)(a+b\log(cx^n))$$

output
```
-1/25*b*d^3*n*x^5-3*b*d^2*e*n*x^(5+r)/(5+r)^2-3*b*d*e^2*n*x^(5+2*r)/(5+2*r
)^2-b*e^3*n*x^(5+3*r)/(5+3*r)^2+1/5*(d^3*x^5+15*d^2*e*x^(5+r)/(5+r)+15*d*e
^2*x^(5+2*r)/(5+2*r)+5*e^3*x^(5+3*r)/(5+3*r))*(a+b*ln(c*x^n))
```

3.398.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 184, normalized size of antiderivative = 1.22

$$\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx = \frac{1}{25}x^5\left(bn\left(-d^3-\frac{75d^2ex^r}{(5+r)^2}-\frac{75de^2x^{2r}}{(5+2r)^2}-\frac{25e^3x^{3r}}{(5+3r)^2}\right)+5a\left(d^3+\frac{15d^2ex^r}{5+r}+\frac{15de^2x^{2r}}{5+2r}+\frac{5e^3x^{3r}}{5+3r}\right)+5b\left(d^3+\frac{15d^2ex^r}{5+r}+\frac{15de^2x^{2r}}{5+2r}+\frac{5e^3x^{3r}}{5+3r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^4*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^5*(b*n*(-d^3 - (75*d^2*e*x^r)/(5 + r)^2 - (75*d*e^2*x^(2*r))/(5 + 2*r)^
2 - (25*e^3*x^(3*r))/(5 + 3*r)^2) + 5*a*(d^3 + (15*d^2*e*x^r)/(5 + r) + (1
5*d*e^2*x^(2*r))/(5 + 2*r) + (5*e^3*x^(3*r))/(5 + 3*r)) + 5*b*(d^3 + (15*d
^2*e*x^r)/(5 + r) + (15*d*e^2*x^(2*r))/(5 + 2*r) + (5*e^3*x^(3*r))/(5 + 3*
r))*Log[c*x^n]))/25
```

3.398.3 Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 150, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{r+5}}{r+5}+\frac{15de^2x^{2r+5}}{2r+5}+\frac{5e^3x^{3r+5}}{3r+5}\right)(a+b\log(cx^n))-bn\int\frac{1}{5}x^4\left(\frac{15d^2ex^r}{r+5}+\frac{15de^2x^{2r}}{2r+5}+\frac{5e^3x^{3r}}{3r+5}+d^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{r+5}}{r+5}+\frac{15de^2x^{2r+5}}{2r+5}+\frac{5e^3x^{3r+5}}{3r+5}\right)(a+b\log(cx^n))-\frac{1}{5}bn\int x^4\left(\frac{15d^2ex^r}{r+5}+\frac{15de^2x^{2r}}{2r+5}+\frac{5e^3x^{3r}}{3r+5}+d^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{r+5}}{r+5}+\frac{15de^2x^{2r+5}}{2r+5}+\frac{5e^3x^{3r+5}}{3r+5}\right)(a+b\log(cx^n))-\frac{1}{5}bn\int\left(\frac{15de^2x^{2(r+2)}}{2r+5}+\frac{15d^2ex^{r+4}}{r+5}+\frac{5e^3x^{3r+4}}{3r+5}+d^3x^4\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{5}\left(d^3x^5+\frac{15d^2ex^{r+5}}{r+5}+\frac{15de^2x^{2r+5}}{2r+5}+\frac{5e^3x^{3r+5}}{3r+5}\right)(a+b\log(cx^n))-\frac{1}{5}bn\left(\frac{d^3x^5}{5}+\frac{15d^2ex^{r+5}}{(r+5)^2}+\frac{15de^2x^{2r+5}}{(2r+5)^2}+\frac{5e^3x^{3r+5}}{(3r+5)^2}\right)$$

input
```
Int[x^4*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/5*(b*n*((d^3*x^5)/5 + (15*d^2*e*x^(5 + r))/(5 + r)^2 + (15*d*e^2*x^(5 +
 2*r))/(5 + 2*r)^2 + (5*e^3*x^(5 + 3*r))/(5 + 3*r)^2)) + ((d^3*x^5 + (15*d
^2*e*x^(5 + r))/(5 + r) + (15*d*e^2*x^(5 + 2*r))/(5 + 2*r) + (5*e^3*x^(5 +
 3*r))/(5 + 3*r))*(a + b*Log[c*x^n]))/5
```

3.398.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.398.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1268 vs. 2(147) = 294.

Time = 26.56 (sec) , antiderivative size = 1269, normalized size of antiderivative = 8.40

method	result	size
parallelrisch	Expression too large to display	1269
risch	Expression too large to display	4031

input
```
int(x^4*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/25*(-78125*x^5*a*d^3-31875*x^5*(x^r)^3*ln(c*x^n)*b*e^3*r^3-187500*x^5*l
n(c*x^n)*b*d^3*r-300*x^5*(x^r)^3*a*e^3*r^5-96875*x^5*(x^r)^3*a*e^3*r^2-140
625*x^5*(x^r)^3*a*e^3*r-181875*x^5*x^r*r^3*a*d^2*e-515625*e*d^2*b*ln(c*x^n
)*x^r*r*x^5-234375*x^5*d^2*e*x^r*b*ln(c*x^n)-234375*x^5*d*e^2*(x^r)^2*b*ln
(c*x^n)-78125*x^5*e^3*(x^r)^3*a-78125*x^5*b*ln(c*x^n)*d^3-78125*x^5*e^3*(x
^r)^3*b*ln(c*x^n)-234375*x^5*d^2*e*x^r*a-234375*x^5*d*e^2*(x^r)^2*a-181250
*x^5*ln(c*x^n)*b*d^3*r^2-24125*x^5*ln(c*x^n)*b*d^3*r^4-90000*x^5*ln(c*x^n)
*b*d^3*r^3-5000*x^5*(x^r)^3*a*e^3*r^4-468750*x^5*(x^r)^2*a*d*e^2*r-2700*x^
5*x^r*ln(c*x^n)*b*d^2*e*r^5-36000*x^5*x^r*ln(c*x^n)*b*d^2*e*r^4-181875*x^5
*x^r*ln(c*x^n)*b*d^2*e*r^3-440625*x^5*x^r*ln(c*x^n)*b*d^2*e*r^2+36*x^5*b*d
^3*n*r^6+660*x^5*b*d^3*n*r^5+4825*x^5*b*d^3*n*r^4+18000*x^5*b*d^3*n*r^3+36
250*x^5*b*d^3*n*r^2+37500*x^5*b*d^3*n*r+15625*x^5*(x^r)^3*b*e^3*n-31875*x^
5*(x^r)^3*a*e^3*r^3-180*x^5*a*d^3*r^6-3300*x^5*a*d^3*r^5-24125*x^5*a*d^3*r
^4-90000*x^5*a*d^3*r^3-181250*x^5*a*d^3*r^2-187500*x^5*a*d^3*r-180*x^5*ln(
c*x^n)*b*d^3*r^6-3300*x^5*ln(c*x^n)*b*d^3*r^5+15625*b*d^3*n*x^5-1350*x^5*(
x^r)^2*ln(c*x^n)*b*d*e^2*r^5-21375*x^5*(x^r)^2*ln(c*x^n)*b*d*e^2*r^4-12750
0*x^5*(x^r)^2*ln(c*x^n)*b*d*e^2*r^3-356250*x^5*(x^r)^2*ln(c*x^n)*b*d*e^2*r
^2-1350*x^5*(x^r)^2*a*d*e^2*r^5-96875*x^5*(x^r)^3*ln(c*x^n)*b*e^3*r^2-4687
50*e^2*d*b*ln(c*x^n)*(x^r)^2*x^5*r-356250*x^5*(x^r)^2*a*d*e^2*r^2-440625*x
^5*x^r*a*d^2*e*r^2-515625*x^5*x^r*a*d^2*e*r-300*x^5*(x^r)^3*ln(c*x^n)*b...
```

3.398.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1023 vs. $2(147) = 294$.

Time = 0.36 (sec) , antiderivative size = 1023, normalized size of antiderivative = 6.77

$$\int x^4(d+ex^r)^3\,(a+b\log{(cx^n)})\,dx = \text{Too large to display}$$

input
```
integrate(x^4*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/25*(5*(36*b*d^3*r^6 + 660*b*d^3*r^5 + 4825*b*d^3*r^4 + 18000*b*d^3*r^3 +
 36250*b*d^3*r^2 + 37500*b*d^3*r + 15625*b*d^3)*x^5*log(c) + 5*(36*b*d^3*n
*r^6 + 660*b*d^3*n*r^5 + 4825*b*d^3*n*r^4 + 18000*b*d^3*n*r^3 + 36250*b*d^
3*n*r^2 + 37500*b*d^3*n*r + 15625*b*d^3*n)*x^5*log(x) - (36*(b*d^3*n - 5*a
*d^3)*r^6 + 660*(b*d^3*n - 5*a*d^3)*r^5 + 15625*b*d^3*n + 4825*(b*d^3*n -
5*a*d^3)*r^4 - 78125*a*d^3 + 18000*(b*d^3*n - 5*a*d^3)*r^3 + 36250*(b*d^3*
n - 5*a*d^3)*r^2 + 37500*(b*d^3*n - 5*a*d^3)*r)*x^5 + 25*((12*b*e^3*r^5 +
200*b*e^3*r^4 + 1275*b*e^3*r^3 + 3875*b*e^3*r^2 + 5625*b*e^3*r + 3125*b*e^
3)*x^5*log(c) + (12*b*e^3*n*r^5 + 200*b*e^3*n*r^4 + 1275*b*e^3*n*r^3 + 387
5*b*e^3*n*r^2 + 5625*b*e^3*n*r + 3125*b*e^3*n)*x^5*log(x) + (12*a*e^3*r^5
- 625*b*e^3*n - 4*(b*e^3*n - 50*a*e^3)*r^4 + 3125*a*e^3 - 15*(4*b*e^3*n -
85*a*e^3)*r^3 - 25*(13*b*e^3*n - 155*a*e^3)*r^2 - 375*(2*b*e^3*n - 15*a*e^
3)*r)*x^5)*x^(3*r) + 75*((18*b*d*e^2*r^5 + 285*b*d*e^2*r^4 + 1700*b*d*e^2*
r^3 + 4750*b*d*e^2*r^2 + 6250*b*d*e^2*r + 3125*b*d*e^2)*x^5*log(c) + (18*b
*d*e^2*n*r^5 + 285*b*d*e^2*n*r^4 + 1700*b*d*e^2*n*r^3 + 4750*b*d*e^2*n*r^2
 + 6250*b*d*e^2*n*r + 3125*b*d*e^2*n)*x^5*log(x) + (18*a*d*e^2*r^5 - 625*b
*d*e^2*n - 3*(3*b*d*e^2*n - 95*a*d*e^2)*r^4 + 3125*a*d*e^2 - 20*(6*b*d*e^2
*n - 85*a*d*e^2)*r^3 - 50*(11*b*d*e^2*n - 95*a*d*e^2)*r^2 - 250*(4*b*d*e^2
*n - 25*a*d*e^2)*r)*x^5)*x^(2*r) + 75*((36*b*d^2*e*r^5 + 480*b*d^2*e*r^4 +
 2425*b*d^2*e*r^3 + 5875*b*d^2*e*r^2 + 6875*b*d^2*e*r + 3125*b*d^2*e)*x...
```

3.398.6 Sympy [F(-1)]

Timed out.

$$\int x^4(d+ex^r)^3\,(a+b\log{(cx^n)})\,dx = \text{Timed out}$$

input
```
integrate(x**4*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

3.398.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 228, normalized size of antiderivative = 1.51

$$\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx = -\frac{1}{25}bd^3nx^5+\frac{1}{5}bd^3x^5\log(cx^n)+\frac{1}{5}ad^3x^5+\frac{be^3x^{3r+5}\log(cx^n)}{3r+5}+\frac{3bde^2x^{2r+5}\log(cx^n)}{2r+5}+\frac{3bd^2ex^{r+5}\log(cx^n)}{r+5}-\frac{be^3nx^{3r+5}}{(3r+5)^2}+\frac{ae^3x^{3r+5}}{3r+5}-\frac{3bde^2nx^{2r+5}}{(2r+5)^2}+\frac{3ade^2x^{2r+5}}{2r+5}-\frac{3bd^2enx^{r+5}}{(r+5)^2}+\frac{3ad^2ex^{r+5}}{r+5}$$

input
```
integrate(x^4*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/25*b*d^3*n*x^5 + 1/5*b*d^3*x^5*log(c*x^n) + 1/5*a*d^3*x^5 + b*e^3*x^(3*
r + 5)*log(c*x^n)/(3*r + 5) + 3*b*d*e^2*x^(2*r + 5)*log(c*x^n)/(2*r + 5) +
 3*b*d^2*e*x^(r + 5)*log(c*x^n)/(r + 5) - b*e^3*n*x^(3*r + 5)/(3*r + 5)^2
+ a*e^3*x^(3*r + 5)/(3*r + 5) - 3*b*d*e^2*n*x^(2*r + 5)/(2*r + 5)^2 + 3*a*
d*e^2*x^(2*r + 5)/(2*r + 5) - 3*b*d^2*e*n*x^(r + 5)/(r + 5)^2 + 3*a*d^2*e*
x^(r + 5)/(r + 5)
```

3.398.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1611 vs. 2(147) = 294.

Time = 0.35 (sec) , antiderivative size = 1611, normalized size of antiderivative = 10.67

$$\int x^4(d+ex^r)^3(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x^4*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/25*(300*b*e^3*n*r^5*x^5*x^(3*r)*log(x) + 1350*b*d*e^2*n*r^5*x^5*x^(2*r)*
log(x) + 2700*b*d^2*e*n*r^5*x^5*x^r*log(x) + 180*b*d^3*n*r^6*x^5*log(x) -
36*b*d^3*n*r^6*x^5 + 300*b*e^3*r^5*x^5*x^(3*r)*log(c) + 1350*b*d*e^2*r^5*x
^5*x^(2*r)*log(c) + 2700*b*d^2*e*r^5*x^5*x^r*log(c) + 180*b*d^3*r^6*x^5*lo
g(c) + 5000*b*e^3*n*r^4*x^5*x^(3*r)*log(x) + 21375*b*d*e^2*n*r^4*x^5*x^(2*
r)*log(x) + 36000*b*d^2*e*n*r^4*x^5*x^r*log(x) + 3300*b*d^3*n*r^5*x^5*log(
x) - 100*b*e^3*n*r^4*x^5*x^(3*r) + 300*a*e^3*r^5*x^5*x^(3*r) - 675*b*d*e^2
*n*r^4*x^5*x^(2*r) + 1350*a*d*e^2*r^5*x^5*x^(2*r) - 2700*b*d^2*e*n*r^4*x^5
*x^r + 2700*a*d^2*e*r^5*x^5*x^r - 660*b*d^3*n*r^5*x^5 + 180*a*d^3*r^6*x^5
+ 5000*b*e^3*r^4*x^5*x^(3*r)*log(c) + 21375*b*d*e^2*r^4*x^5*x^(2*r)*log(c)
 + 36000*b*d^2*e*r^4*x^5*x^r*log(c) + 3300*b*d^3*r^5*x^5*log(c) + 31875*b*
e^3*n*r^3*x^5*x^(3*r)*log(x) + 127500*b*d*e^2*n*r^3*x^5*x^(2*r)*log(x) + 1
81875*b*d^2*e*n*r^3*x^5*x^r*log(x) + 24125*b*d^3*n*r^4*x^5*log(x) - 1500*b
*e^3*n*r^3*x^5*x^(3*r) + 5000*a*e^3*r^4*x^5*x^(3*r) - 9000*b*d*e^2*n*r^3*x
^5*x^(2*r) + 21375*a*d*e^2*r^4*x^5*x^(2*r) - 22500*b*d^2*e*n*r^3*x^5*x^r +
 36000*a*d^2*e*r^4*x^5*x^r - 4825*b*d^3*n*r^4*x^5 + 3300*a*d^3*r^5*x^5 + 3
1875*b*e^3*r^3*x^5*x^(3*r)*log(c) + 127500*b*d*e^2*r^3*x^5*x^(2*r)*log(c)
+ 181875*b*d^2*e*r^3*x^5*x^r*log(c) + 24125*b*d^3*r^4*x^5*log(c) + 96875*b
*e^3*n*r^2*x^5*x^(3*r)*log(x) + 356250*b*d*e^2*n*r^2*x^5*x^(2*r)*log(x) +
440625*b*d^2*e*n*r^2*x^5*x^r*log(x) + 90000*b*d^3*n*r^3*x^5*log(x) - 81...
```

3.398.9 Mupad [F(-1)]

Timed out.

$$\int x^4(d+ex^r)^3\left(a+b\log\left(cx^n\right)\right)\,dx=\int x^4\left(d+e\,x^r\right)^3\left(a+b\,\ln\left(c\,x^n\right)\right)\,dx$$

input
```
int(x^4*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int(x^4*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.399 $\int x^2(d+ex^r)^3\,(a+b\log(cx^n))\,dx$

3.399.1 Optimal result

Integrand size = 23, antiderivative size = 148

$$\int x^2(d+ex^r)^3\,(a+b\log(cx^n))\,dx = -\frac{1}{9}bd^3nx^3-\frac{be^3nx^{3(1+r)}}{9(1+r)^2}-\frac{3bd^2enx^{3+r}}{(3+r)^2}-\frac{3bde^2nx^{3+2r}}{(3+2r)^2}+\frac{1}{3}\left(d^3x^3+\frac{e^3x^{3(1+r)}}{1+r}+\frac{9d^2ex^{3+r}}{3+r}+\frac{9de^2x^{3+2r}}{3+2r}\right)(a+b\log(cx^n))$$

output
```
-1/9*b*d^3*n*x^3-1/9*b*e^3*n*x^(3+3*r)/(1+r)^2-3*b*d^2*e*n*x^(3+r)/(3+r)^2
-3*b*d*e^2*n*x^(3+2*r)/(3+2*r)^2+1/3*(d^3*x^3+e^3*x^(3+3*r)/(1+r)+9*d^2*e*
x^(3+r)/(3+r)+9*d*e^2*x^(3+2*r)/(3+2*r))*(a+b*ln(c*x^n))
```

3.399.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 176, normalized size of antiderivative = 1.19

$$\int x^2(d+ex^r)^3\,(a+b\log(cx^n))\,dx = \frac{1}{9}x^3\left(bn\left(-d^3-\frac{27d^2ex^r}{(3+r)^2}-\frac{27de^2x^{2r}}{(3+2r)^2}-\frac{e^3x^{3r}}{(1+r)^2}\right)+3a\left(d^3+\frac{9d^2ex^r}{3+r}+\frac{9de^2x^{2r}}{3+2r}+\frac{e^3x^{3r}}{1+r}\right)+3b\left(d^3+\frac{9d^2ex^r}{3+r}+\frac{9de^2x^{2r}}{3+2r}+\frac{e^3x^{3r}}{1+r}\right)\log(cx^n)\right)$$

input
```
Integrate[x^2*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
(x^3*(b*n*(-d^3 - (27*d^2*e*x^r)/(3 + r)^2 - (27*d*e^2*x^(2*r))/(3 + 2*r)^
2 - (e^3*x^(3*r))/(1 + r)^2) + 3*a*(d^3 + (9*d^2*e*x^r)/(3 + r) + (9*d*e^2
*x^(2*r))/(3 + 2*r) + (e^3*x^(3*r))/(1 + r)) + 3*b*(d^3 + (9*d^2*e*x^r)/(3
 + r) + (9*d*e^2*x^(2*r))/(3 + 2*r) + (e^3*x^(3*r))/(1 + r))*Log[c*x^n]))/
9
```

3.399.3 Rubi [A] (verified)

Time = 0.57 (sec) , antiderivative size = 147, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2771, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int x^2(d+ex^r)^3(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2771}$$

$$\frac{1}{3}\left(d^3x^3+\frac{9d^2ex^{r+3}}{r+3}+\frac{9de^2x^{2r+3}}{2r+3}+\frac{e^3x^{3(r+1)}}{r+1}\right)(a+b\log(cx^n))-bn\int \frac{1}{3}x^2\left(\frac{9d^2ex^r}{r+3}+\frac{9de^2x^{2r}}{2r+3}+\frac{e^3x^{3r}}{r+1}+d^3\right)dx$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{3}\left(d^3x^3+\frac{9d^2ex^{r+3}}{r+3}+\frac{9de^2x^{2r+3}}{2r+3}+\frac{e^3x^{3(r+1)}}{r+1}\right)(a+b\log(cx^n))-\frac{1}{3}bn\int x^2\left(\frac{9d^2ex^r}{r+3}+\frac{9de^2x^{2r}}{2r+3}+\frac{e^3x^{3r}}{r+1}+d^3\right)dx$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{3}\left(d^3x^3+\frac{9d^2ex^{r+3}}{r+3}+\frac{9de^2x^{2r+3}}{2r+3}+\frac{e^3x^{3(r+1)}}{r+1}\right)(a+b\log(cx^n))-\frac{1}{3}bn\int\left(\frac{9de^2x^{2(r+1)}}{2r+3}+\frac{9d^2ex^{r+2}}{r+3}+\frac{e^3x^{3r+2}}{r+1}+d^3x^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{1}{3}\left(d^3x^3+\frac{9d^2ex^{r+3}}{r+3}+\frac{9de^2x^{2r+3}}{2r+3}+\frac{e^3x^{3(r+1)}}{r+1}\right)(a+b\log(cx^n))-\frac{1}{3}bn\left(\frac{d^3x^3}{3}+\frac{9d^2ex^{r+3}}{(r+3)^2}+\frac{9de^2x^{2r+3}}{(2r+3)^2}+\frac{e^3x^{3(r+1)}}{3(r+1)^2}\right)$$

input
```
Int[x^2*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-1/3*(b*n*((d^3*x^3)/3 + (e^3*x^(3*(1 + r)))/(3*(1 + r)^2) + (9*d^2*e*x^(3
 + r))/(3 + r)^2 + (9*d*e^2*x^(3 + 2*r))/(3 + 2*r)^2)) + ((d^3*x^3 + (e^3*
x^(3*(1 + r)))/(1 + r) + (9*d^2*e*x^(3 + r))/(3 + r) + (9*d*e^2*x^(3 + 2*r
))/(3 + 2*r))*(a + b*Log[c*x^n]))/3
```

3.399.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2771
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[u*(a
 + b*Log[c*x^n]), x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /;
 FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IGtQ[m, 0]
```

3.399.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1256 vs. 2(142) = 284.

Time = 9.67 (sec) , antiderivative size = 1257, normalized size of antiderivative = 8.49

method	result	size
parallelrisch	Expression too large to display	1257
risch	Expression too large to display	4027

input
```
int(x^2*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-1/9*(-243*a*d^3*x^3-108*x^3*x^r*a*d^2*e*r^5-864*x^3*x^r*a*d^2*e*r^4+324*x
^3*b*d^3*n*r-579*x^3*a*d^3*r^4-1296*x^3*a*d^3*r^3-1566*x^3*a*d^3*r^2-972*x
^3*a*d^3*r-729*x^3*d^2*e*x^r*b*ln(c*x^n)-243*x^3*e^3*(x^r)^3*a-243*x^3*b*l
n(c*x^n)*d^3+81*x^3*(x^r)^3*b*e^3*n+4*x^3*b*d^3*n*r^6+44*x^3*b*d^3*n*r^5+1
93*x^3*b*d^3*n*r^4+432*x^3*b*d^3*n*r^3+522*x^3*b*d^3*n*r^2-729*x^3*d^2*e*x
^r*a-243*x^3*e^3*(x^r)^3*b*ln(c*x^n)-729*x^3*d*e^2*(x^r)^2*a+540*x^3*x^r*b
*d^2*e*n*r^3+999*x^3*x^r*b*d^2*e*n*r^2+810*x^3*x^r*b*d^2*e*n*r-120*x^3*(x^
r)^3*a*e^3*r^4-459*x^3*(x^r)^3*a*e^3*r^3-837*x^3*(x^r)^3*a*e^3*r^2-12*x^3*
ln(c*x^n)*b*d^3*r^6-132*x^3*ln(c*x^n)*b*d^3*r^5-579*x^3*ln(c*x^n)*b*d^3*r^
4-1296*x^3*ln(c*x^n)*b*d^3*r^3-12*x^3*a*d^3*r^6-132*x^3*a*d^3*r^5-729*x^3*
d*e^2*(x^r)^2*b*ln(c*x^n)+27*x^3*(x^r)^2*b*d*e^2*n*r^4+216*x^3*(x^r)^2*b*d
*e^2*n*r^3+594*x^3*(x^r)^2*b*d*e^2*n*r^2+648*x^3*(x^r)^2*b*d*e^2*n*r-108*x
^3*x^r*ln(c*x^n)*b*d^2*e*r^5-864*x^3*x^r*ln(c*x^n)*b*d^2*e*r^4-2619*x^3*x^
r*ln(c*x^n)*b*d^2*e*r^3-3807*x^3*x^r*ln(c*x^n)*b*d^2*e*r^2-54*x^3*(x^r)^2*
ln(c*x^n)*b*d*e^2*r^5+108*x^3*x^r*b*d^2*e*n*r^4-513*x^3*(x^r)^2*ln(c*x^n)*
b*d*e^2*r^4-1836*x^3*(x^r)^2*ln(c*x^n)*b*d*e^2*r^3-3078*x^3*(x^r)^2*ln(c*x
^n)*b*d*e^2*r^2-2673*e*d^2*b*ln(c*x^n)*x^r*r*x^3-729*x^3*(x^r)^3*a*e^3*r+1
17*x^3*(x^r)^3*b*e^3*n*r^2+162*x^3*(x^r)^3*b*e^3*n*r+243*x^3*(x^r)^2*b*d*e
^2*n+243*x^3*x^r*b*d^2*e*n+4*x^3*(x^r)^3*b*e^3*n*r^4+81*b*d^3*n*x^3-12*x^3
*(x^r)^3*a*e^3*r^5-1566*x^3*ln(c*x^n)*b*d^3*r^2-972*x^3*ln(c*x^n)*b*d^3...
```

3.399.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1022 vs. 2(142) = 284.

Time = 0.32 (sec) , antiderivative size = 1022, normalized size of antiderivative = 6.91

$$\int x^2(d+ex^r)^3\left(a+b\log\left(cx^n\right)\right)\,dx$$
$$=\frac{3\left(4\,bd^3r^6+44\,bd^3r^5+193\,bd^3r^4+432\,bd^3r^3+522\,bd^3r^2+324\,bd^3r+81\,bd^3\right)x^3\log\left(c\right)+3\left(4\,bd^3nr^6+44\right.}{}$$

input
```
integrate(x^2*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
1/9*(3*(4*b*d^3*r^6 + 44*b*d^3*r^5 + 193*b*d^3*r^4 + 432*b*d^3*r^3 + 522*b
*d^3*r^2 + 324*b*d^3*r + 81*b*d^3)*x^3*log(c) + 3*(4*b*d^3*n*r^6 + 44*b*d^
3*n*r^5 + 193*b*d^3*n*r^4 + 432*b*d^3*n*r^3 + 522*b*d^3*n*r^2 + 324*b*d^3*
n*r + 81*b*d^3*n)*x^3*log(x) - (4*(b*d^3*n - 3*a*d^3)*r^6 + 44*(b*d^3*n -
3*a*d^3)*r^5 + 81*b*d^3*n + 193*(b*d^3*n - 3*a*d^3)*r^4 - 243*a*d^3 + 432*
(b*d^3*n - 3*a*d^3)*r^3 + 522*(b*d^3*n - 3*a*d^3)*r^2 + 324*(b*d^3*n - 3*a
*d^3)*r)*x^3 + (3*(4*b*e^3*r^5 + 40*b*e^3*r^4 + 153*b*e^3*r^3 + 279*b*e^3*
r^2 + 243*b*e^3*r + 81*b*e^3)*x^3*log(c) + 3*(4*b*e^3*n*r^5 + 40*b*e^3*n*r
^4 + 153*b*e^3*n*r^3 + 279*b*e^3*n*r^2 + 243*b*e^3*n*r + 81*b*e^3*n)*x^3*l
og(x) + (12*a*e^3*r^5 - 81*b*e^3*n - 4*(b*e^3*n - 30*a*e^3)*r^4 + 243*a*e^
3 - 9*(4*b*e^3*n - 51*a*e^3)*r^3 - 9*(13*b*e^3*n - 93*a*e^3)*r^2 - 81*(2*b
*e^3*n - 9*a*e^3)*r)*x^3)*x^(3*r) + 27*((2*b*d*e^2*r^5 + 19*b*d*e^2*r^4 +
68*b*d*e^2*r^3 + 114*b*d*e^2*r^2 + 90*b*d*e^2*r + 27*b*d*e^2)*x^3*log(c) +
 (2*b*d*e^2*n*r^5 + 19*b*d*e^2*n*r^4 + 68*b*d*e^2*n*r^3 + 114*b*d*e^2*n*r^
2 + 90*b*d*e^2*n*r + 27*b*d*e^2*n)*x^3*log(x) + (2*a*d*e^2*r^5 - 9*b*d*e^2
*n - (b*d*e^2*n - 19*a*d*e^2)*r^4 + 27*a*d*e^2 - 4*(2*b*d*e^2*n - 17*a*d*e
^2)*r^3 - 2*(11*b*d*e^2*n - 57*a*d*e^2)*r^2 - 6*(4*b*d*e^2*n - 15*a*d*e^2)
*r)*x^3)*x^(2*r) + 27*((4*b*d^2*e*r^5 + 32*b*d^2*e*r^4 + 97*b*d^2*e*r^3 +
141*b*d^2*e*r^2 + 99*b*d^2*e*r + 27*b*d^2*e)*x^3*log(c) + (4*b*d^2*e*n*r^5
 + 32*b*d^2*e*n*r^4 + 97*b*d^2*e*n*r^3 + 141*b*d^2*e*n*r^2 + 99*b*d^2*e...
```

3.399.6 Sympy [F(-1)]

Timed out.

$$\int x^2(d+ex^r)^3(a+b\log(cx^n))\,dx=\text{Timed out}$$

input
```
integrate(x**2*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

3.399.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 224, normalized size of antiderivative = 1.51

$$\int x^2(d+ex^r)^3(a+b\log(cx^n))\,dx=-\frac{1}{9}bd^3nx^3+\frac{1}{3}bd^3x^3\log(cx^n)+\frac{1}{3}ad^3x^3+\frac{be^3x^{3r+3}\log(cx^n)}{3(r+1)}+\frac{3bde^2x^{2r+3}\log(cx^n)}{2r+3}+\frac{3bd^2ex^{r+3}\log(cx^n)}{r+3}-\frac{be^3nx^{3r+3}}{9(r+1)^2}+\frac{ae^3x^{3r+3}}{3(r+1)}-\frac{3bde^2nx^{2r+3}}{(2r+3)^2}+\frac{3ade^2x^{2r+3}}{2r+3}-\frac{3bd^2enx^{r+3}}{(r+3)^2}+\frac{3ad^2ex^{r+3}}{r+3}$$

input
```
integrate(x^2*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-1/9*b*d^3*n*x^3 + 1/3*b*d^3*x^3*log(c*x^n) + 1/3*a*d^3*x^3 + 1/3*b*e^3*x^
(3*r + 3)*log(c*x^n)/(r + 1) + 3*b*d*e^2*x^(2*r + 3)*log(c*x^n)/(2*r + 3)
+ 3*b*d^2*e*x^(r + 3)*log(c*x^n)/(r + 3) - 1/9*b*e^3*n*x^(3*r + 3)/(r + 1)
^2 + 1/3*a*e^3*x^(3*r + 3)/(r + 1) - 3*b*d*e^2*n*x^(2*r + 3)/(2*r + 3)^2 +
 3*a*d*e^2*x^(2*r + 3)/(2*r + 3) - 3*b*d^2*e*n*x^(r + 3)/(r + 3)^2 + 3*a*d
^2*e*x^(r + 3)/(r + 3)
```

3.399.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1611 vs. 2(142) = 284.

Time = 0.33 (sec) , antiderivative size = 1611, normalized size of antiderivative = 10.89

$$\int x^2(d+ex^r)^3(a+b\log(cx^n))\,dx = \text{Too large to display}$$

input
```
integrate(x^2*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
1/9*(12*b*e^3*n*r^5*x^3*x^(3*r)*log(x) + 54*b*d*e^2*n*r^5*x^3*x^(2*r)*log(
x) + 108*b*d^2*e*n*r^5*x^3*x^r*log(x) + 12*b*d^3*n*r^6*x^3*log(x) - 4*b*d^
3*n*r^6*x^3 + 12*b*e^3*r^5*x^3*x^(3*r)*log(c) + 54*b*d*e^2*r^5*x^3*x^(2*r)
*log(c) + 108*b*d^2*e*r^5*x^3*x^r*log(c) + 12*b*d^3*r^6*x^3*log(c) + 120*b
*e^3*n*r^4*x^3*x^(3*r)*log(x) + 513*b*d*e^2*n*r^4*x^3*x^(2*r)*log(x) + 864
*b*d^2*e*n*r^4*x^3*x^r*log(x) + 132*b*d^3*n*r^5*x^3*log(x) - 4*b*e^3*n*r^4
*x^3*x^(3*r) + 12*a*e^3*r^5*x^3*x^(3*r) - 27*b*d*e^2*n*r^4*x^3*x^(2*r) + 5
4*a*d*e^2*r^5*x^3*x^(2*r) - 108*b*d^2*e*n*r^4*x^3*x^r + 108*a*d^2*e*r^5*x^
3*x^r - 44*b*d^3*n*r^5*x^3 + 12*a*d^3*r^6*x^3 + 120*b*e^3*r^4*x^3*x^(3*r)*
log(c) + 513*b*d*e^2*r^4*x^3*x^(2*r)*log(c) + 864*b*d^2*e*r^4*x^3*x^r*log(
c) + 132*b*d^3*r^5*x^3*log(c) + 459*b*e^3*n*r^3*x^3*x^(3*r)*log(x) + 1836*
b*d*e^2*n*r^3*x^3*x^(2*r)*log(x) + 2619*b*d^2*e*n*r^3*x^3*x^r*log(x) + 579
*b*d^3*n*r^4*x^3*log(x) - 36*b*e^3*n*r^3*x^3*x^(3*r) + 120*a*e^3*r^4*x^3*x
^(3*r) - 216*b*d*e^2*n*r^3*x^3*x^(2*r) + 513*a*d*e^2*r^4*x^3*x^(2*r) - 540
*b*d^2*e*n*r^3*x^3*x^r + 864*a*d^2*e*r^4*x^3*x^r - 193*b*d^3*n*r^4*x^3 + 1
32*a*d^3*r^5*x^3 + 459*b*e^3*r^3*x^3*x^(3*r)*log(c) + 1836*b*d*e^2*r^3*x^3
*x^(2*r)*log(c) + 2619*b*d^2*e*r^3*x^3*x^r*log(c) + 579*b*d^3*r^4*x^3*log(
c) + 837*b*e^3*n*r^2*x^3*x^(3*r)*log(x) + 3078*b*d*e^2*n*r^2*x^3*x^(2*r)*l
og(x) + 3807*b*d^2*e*n*r^2*x^3*x^r*log(x) + 1296*b*d^3*n*r^3*x^3*log(x) -
117*b*e^3*n*r^2*x^3*x^(3*r) + 459*a*e^3*r^3*x^3*x^(3*r) - 594*b*d*e^2*n...
```

3.399.9 Mupad [F(-1)]

Timed out.

$$\int x^2(d+ex^r)^3(a+b\log(cx^n))\,dx = \int x^2\,(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int(x^2*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int(x^2*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.400 $\int (d+ex^r)^3 (a+b\log(cx^n))\,dx$

3.400.1 Optimal result

Integrand size = 20, antiderivative size = 169

$$\int (d+ex^r)^3 (a+b\log(cx^n))\,dx = -bd^3nx - \frac{3bd^2enx^{1+r}}{(1+r)^2} - \frac{3bde^2nx^{1+2r}}{(1+2r)^2} - \frac{be^3nx^{1+3r}}{(1+3r)^2} + d^3x(a+b\log(cx^n)) + \frac{3d^2ex^{1+r}(a+b\log(cx^n))}{1+r} + \frac{3de^2x^{1+2r}(a+b\log(cx^n))}{1+2r} + \frac{e^3x^{1+3r}(a+b\log(cx^n))}{1+3r}$$

output
```
-b*d^3*n*x-3*b*d^2*e*n*x^(1+r)/(1+r)^2-3*b*d*e^2*n*x^(1+2*r)/(1+2*r)^2-b*e
^3*n*x^(1+3*r)/(1+3*r)^2+d^3*x*(a+b*ln(c*x^n))+3*d^2*e*x^(1+r)*(a+b*ln(c*x
^n))/(1+r)+3*d*e^2*x^(1+2*r)*(a+b*ln(c*x^n))/(1+2*r)+e^3*x^(1+3*r)*(a+b*ln
(c*x^n))/(1+3*r)
```

3.400.2 Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 159, normalized size of antiderivative = 0.94

$$\int (d+ex^r)^3 (a+b\log(cx^n))\,dx = x\left(ad^3 - bd^3n - \frac{3bd^2enx^r}{(1+r)^2} - \frac{3bde^2nx^{2r}}{(1+2r)^2} - \frac{be^3nx^{3r}}{(1+3r)^2} + bd^3\log(cx^n) + \frac{3d^2ex^r(a+b\log(cx^n))}{1+r} + \frac{3de^2x^{2r}(a+b\log(cx^n))}{1+2r} + \frac{e^3x^{3r}(a+b\log(cx^n))}{1+3r}\right)$$

input
```
Integrate[(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
x*(a*d^3 - b*d^3*n - (3*b*d^2*e*n*x^r)/(1 + r)^2 - (3*b*d*e^2*n*x^(2*r))/(
1 + 2*r)^2 - (b*e^3*n*x^(3*r))/(1 + 3*r)^2 + b*d^3*Log[c*x^n] + (3*d^2*e*x
^r*(a + b*Log[c*x^n]))/(1 + r) + (3*d*e^2*x^(2*r)*(a + b*Log[c*x^n]))/(1 +
 2*r) + (e^3*x^(3*r)*(a + b*Log[c*x^n]))/(1 + 3*r))
```

3.400.3 Rubi [A] (verified)

Time = 0.35 (sec) , antiderivative size = 164, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.100, Rules used = {2750, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (d+ex^r)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2750}$$

$$-bn\int \left(\frac{3d^2ex^r}{r+1}+\frac{3de^2x^{2r}}{2r+1}+\frac{e^3x^{3r}}{3r+1}+d^3\right)dx+d^3x(a+b\log(cx^n))+\frac{3d^2ex^{r+1}(a+b\log(cx^n))}{r+1}+\frac{3de^2x^{2r+1}(a+b\log(cx^n))}{2r+1}+\frac{e^3x^{3r+1}(a+b\log(cx^n))}{3r+1}$$

$$\Big\downarrow \text{2009}$$

$$d^3x(a+b\log(cx^n))+\frac{3d^2ex^{r+1}(a+b\log(cx^n))}{r+1}+\frac{3de^2x^{2r+1}(a+b\log(cx^n))}{2r+1}+\frac{e^3x^{3r+1}(a+b\log(cx^n))}{3r+1}-bn\left(d^3x+\frac{3d^2ex^{r+1}}{(r+1)^2}+\frac{3de^2x^{2r+1}}{(2r+1)^2}+\frac{e^3x^{3r+1}}{(3r+1)^2}\right)$$

input
```
Int[(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*(d^3*x + (3*d^2*e*x^(1 + r))/(1 + r)^2 + (3*d*e^2*x^(1 + 2*r))/(1 +
2*r)^2 + (e^3*x^(1 + 3*r))/(1 + 3*r)^2)) + d^3*x*(a + b*Log[c*x^n]) + (3*d
^2*e*x^(1 + r)*(a + b*Log[c*x^n]))/(1 + r) + (3*d*e^2*x^(1 + 2*r)*(a + b*L
og[c*x^n]))/(1 + 2*r) + (e^3*x^(1 + 3*r)*(a + b*Log[c*x^n]))/(1 + 3*r)
```

3.400.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2750
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.),
x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q, x]}, Simp[(a + b*Log[c*x^n])
  u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]] /; FreeQ[{a, b,
 c, d, e, n, r}, x] && IGtQ[q, 0]
```

3.400.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1107 vs. $2(169) = 338$.

Time = 3.41 (sec) , antiderivative size = 1108, normalized size of antiderivative = 6.56

method	result	size
parallelrisch	Expression too large to display	1108
risch	Expression too large to display	4023

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-36*x*a*d^3*r^6-132*x*a*d^3*r^5-193*x*a*d^3*r^4-144*x*a*d^3*r^3-58*x*a*d
^3*r^2-12*x*a*d^3*r-40*x*(x^r)^3*a*e^3*r^4-51*x*(x^r)^3*a*e^3*r^3-31*x*(x^
r)^3*a*e^3*r^2+36*x*b*d^3*n*r^6+132*x*b*d^3*n*r^5+193*x*b*d^3*n*r^4-3*x*d^
2*e*x^r*b*ln(c*x^n)-3*x*d*e^2*(x^r)^2*b*ln(c*x^n)-x*e^3*(x^r)^3*a-x*b*ln(c
*x^n)*d^3-a*d^3*x-3*x*d*e^2*(x^r)^2*a-x*e^3*(x^r)^3*b*ln(c*x^n)-3*x*d^2*e*
x^r*a+4*x*(x^r)^3*b*e^3*n*r^4+x*(x^r)^3*b*e^3*n+144*x*b*d^3*n*r^3+58*x*b*d
^3*n*r^2+12*x*b*d^3*n*r-9*x*(x^r)^3*a*e^3*r-33*x*x^r*r*a*d^2*e+30*x*x^r*b*
d^2*e*n*r+27*x*(x^r)^2*b*d*e^2*n*r^4+72*x*(x^r)^2*b*d*e^2*n*r^3+108*x*x^r*
b*d^2*e*n*r^4+66*x*(x^r)^2*b*d*e^2*n*r^2+180*x*x^r*b*d^2*e*n*r^3+24*x*(x^r
)^2*b*d*e^2*n*r+111*x*x^r*b*d^2*e*n*r^2+b*d^3*n*x-114*x*(x^r)^2*ln(c*x^n)*
b*d*e^2*r^2-30*x*(x^r)^2*ln(c*x^n)*b*d*e^2*r-12*x*ln(c*x^n)*b*d^3*r-36*x*l
n(c*x^n)*b*d^3*r^6-132*x*ln(c*x^n)*b*d^3*r^5-193*x*ln(c*x^n)*b*d^3*r^4-144
*x*ln(c*x^n)*b*d^3*r^3-58*x*ln(c*x^n)*b*d^3*r^2-291*x*x^r*ln(c*x^n)*b*d^2*
e*r^3-141*x*x^r*ln(c*x^n)*b*d^2*e*r^2-33*x*x^r*ln(c*x^n)*b*d^2*e*r-54*x*(x
^r)^2*ln(c*x^n)*b*d*e^2*r^5-171*x*(x^r)^2*ln(c*x^n)*b*d*e^2*r^4-204*x*(x^r
)^2*ln(c*x^n)*b*d*e^2*r^3-12*x*(x^r)^3*a*e^3*r^5-30*x*(x^r)^2*a*d*e^2*r-9*
e^3*b*ln(c*x^n)*(x^r)^3*x*r-108*x*x^r*ln(c*x^n)*b*d^2*e*r^5-288*x*x^r*ln(c
*x^n)*b*d^2*e*r^4+12*x*(x^r)^3*b*e^3*n*r^3+13*x*(x^r)^3*b*e^3*n*r^2+6*x*(x
^r)^3*b*e^3*n*r+3*x*(x^r)^2*b*d*e^2*n-141*x*x^r*a*d^2*e*r^2-54*x*(x^r)^2*a
*d*e^2*r^5-171*x*(x^r)^2*a*d*e^2*r^4-204*x*(x^r)^2*a*d*e^2*r^3-114*x*(x...
```

3.400.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 983 vs. $2(169) = 338$.

Time = 0.31 (sec) , antiderivative size = 983, normalized size of antiderivative = 5.82

$$\int (d+ex^r)^3 (a+b\log(cx^n))\, dx$$
$$= \frac{(36\, bd^3r^6 + 132\, bd^3r^5 + 193\, bd^3r^4 + 144\, bd^3r^3 + 58\, bd^3r^2 + 12\, bd^3r + bd^3)x\log(c) + (36\, bd^3nr^6 + 132\, bd^3r}{}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((36*b*d^3*r^6 + 132*b*d^3*r^5 + 193*b*d^3*r^4 + 144*b*d^3*r^3 + 58*b*d^3*
r^2 + 12*b*d^3*r + b*d^3)*x*log(c) + (36*b*d^3*n*r^6 + 132*b*d^3*n*r^5 + 1
93*b*d^3*n*r^4 + 144*b*d^3*n*r^3 + 58*b*d^3*n*r^2 + 12*b*d^3*n*r + b*d^3*n
)*x*log(x) - (36*(b*d^3*n - a*d^3)*r^6 + 132*(b*d^3*n - a*d^3)*r^5 + b*d^3
*n + 193*(b*d^3*n - a*d^3)*r^4 - a*d^3 + 144*(b*d^3*n - a*d^3)*r^3 + 58*(b
*d^3*n - a*d^3)*r^2 + 12*(b*d^3*n - a*d^3)*r)*x + ((12*b*e^3*r^5 + 40*b*e^
3*r^4 + 51*b*e^3*r^3 + 31*b*e^3*r^2 + 9*b*e^3*r + b*e^3)*x*log(c) + (12*b*
e^3*n*r^5 + 40*b*e^3*n*r^4 + 51*b*e^3*n*r^3 + 31*b*e^3*n*r^2 + 9*b*e^3*n*r
 + b*e^3*n)*x*log(x) + (12*a*e^3*r^5 - b*e^3*n - 4*(b*e^3*n - 10*a*e^3)*r^
4 + a*e^3 - 3*(4*b*e^3*n - 17*a*e^3)*r^3 - (13*b*e^3*n - 31*a*e^3)*r^2 - 3
*(2*b*e^3*n - 3*a*e^3)*r)*x)*x^(3*r) + 3*((18*b*d*e^2*r^5 + 57*b*d*e^2*r^4
 + 68*b*d*e^2*r^3 + 38*b*d*e^2*r^2 + 10*b*d*e^2*r + b*d*e^2)*x*log(c) + (1
8*b*d*e^2*n*r^5 + 57*b*d*e^2*n*r^4 + 68*b*d*e^2*n*r^3 + 38*b*d*e^2*n*r^2 +
 10*b*d*e^2*n*r + b*d*e^2*n)*x*log(x) + (18*a*d*e^2*r^5 - b*d*e^2*n - 3*(3
*b*d*e^2*n - 19*a*d*e^2)*r^4 + a*d*e^2 - 4*(6*b*d*e^2*n - 17*a*d*e^2)*r^3
- 2*(11*b*d*e^2*n - 19*a*d*e^2)*r^2 - 2*(4*b*d*e^2*n - 5*a*d*e^2)*r)*x)*x^
(2*r) + 3*((36*b*d^2*e*r^5 + 96*b*d^2*e*r^4 + 97*b*d^2*e*r^3 + 47*b*d^2*e*
r^2 + 11*b*d^2*e*r + b*d^2*e)*x*log(c) + (36*b*d^2*e*n*r^5 + 96*b*d^2*e*n*
r^4 + 97*b*d^2*e*n*r^3 + 47*b*d^2*e*n*r^2 + 11*b*d^2*e*n*r + b*d^2*e*n)*x*
log(x) + (36*a*d^2*e*r^5 - b*d^2*e*n - 12*(3*b*d^2*e*n - 8*a*d^2*e)*r^4...
```

3.400. $\int (d+ex^r)^3 (a+b\log(cx^n)) \, dx$

3.400.6 Sympy [A] (verification not implemented)

Time = 3.89 (sec) , antiderivative size = 325, normalized size of antiderivative = 1.92

$$\int (d+ex^r)^3 (a+b\log(cx^n))\,dx$$
$$= ad^3x + 3ad^2e\left(\begin{cases}\frac{x^{r+1}}{r+1} & \text{for } r\neq -1\\ \log(x) & \text{otherwise}\end{cases}\right) + 3ade^2\left(\begin{cases}\frac{x^{2r+1}}{2r+1} & \text{for } r\neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)$$
$$+ ae^3\left(\begin{cases}\frac{x^{3r+1}}{3r+1} & \text{for } r\neq -\frac{1}{3}\\ \log(x) & \text{otherwise}\end{cases}\right) - bd^3nx + bd^3x\log(cx^n)$$
$$- 3bd^2en\left(\begin{cases}\frac{\begin{cases}\frac{x^{r+1}}{r+1} & \text{for } r\neq -1\\ \log(x) & \text{otherwise}\end{cases}}{r+1} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq -1\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 3bd^2e\left(\begin{cases}\frac{x^{r+1}}{r+1} & \text{for } r\neq -1\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$
$$- 3bde^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r+1}}{2r+1} & \text{for } r\neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r+1} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq -\frac{1}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 3bde^2\left(\begin{cases}\frac{x^{2r+1}}{2r+1} & \text{for } r\neq -\frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$
$$- be^3n\left(\begin{cases}\frac{\begin{cases}\frac{x^{3r+1}}{3r+1} & \text{for } r\neq -\frac{1}{3}\\ \log(x) & \text{otherwise}\end{cases}}{3r+1} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq -\frac{1}{3}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ be^3\left(\begin{cases}\frac{x^{3r+1}}{3r+1} & \text{for } r\neq -\frac{1}{3}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
a*d**3*x + 3*a*d**2*e*Piecewise((x**(r + 1)/(r + 1), Ne(r, -1)), (log(x),
True)) + 3*a*d*e**2*Piecewise((x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(
x), True)) + a*e**3*Piecewise((x**(3*r + 1)/(3*r + 1), Ne(r, -1/3)), (log(
x), True)) - b*d**3*n*x + b*d**3*x*log(c*x**n) - 3*b*d**2*e*n*Piecewise((P
iecewise((x**(r + 1)/(r + 1), Ne(r, -1)), (log(x), True))/(r + 1), (r > -o
o) & (r < oo) & Ne(r, -1)), (log(x)**2/2, True)) + 3*b*d**2*e*Piecewise((x
**(r + 1)/(r + 1), Ne(r, -1)), (log(x), True))*log(c*x**n) - 3*b*d*e**2*n*
Piecewise((Piecewise((x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(x), True)
)/(2*r + 1), (r > -oo) & (r < oo) & Ne(r, -1/2)), (log(x)**2/2, True)) + 3
*b*d*e**2*Piecewise((x**(2*r + 1)/(2*r + 1), Ne(r, -1/2)), (log(x), True))
*log(c*x**n) - b*e**3*n*Piecewise((Piecewise((x**(3*r + 1)/(3*r + 1), Ne(r
, -1/3)), (log(x), True))/(3*r + 1), (r > -oo) & (r < oo) & Ne(r, -1/3)),
(log(x)**2/2, True)) + b*e**3*Piecewise((x**(3*r + 1)/(3*r + 1), Ne(r, -1/
3)), (log(x), True))*log(c*x**n)
```

3.400.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 220, normalized size of antiderivative = 1.30

$$\int (d+ex^r)^3 (a+b\log(cx^n))\,dx = -bd^3nx + bd^3x\log(cx^n) + ad^3x + \frac{be^3x^{3r+1}\log(cx^n)}{3r+1} + \frac{3bde^2x^{2r+1}\log(cx^n)}{2r+1} + \frac{3bd^2ex^{r+1}\log(cx^n)}{r+1} - \frac{be^3nx^{3r+1}}{(3r+1)^2} + \frac{ae^3x^{3r+1}}{3r+1} - \frac{3bde^2nx^{2r+1}}{(2r+1)^2} + \frac{3ade^2x^{2r+1}}{2r+1} - \frac{3bd^2enx^{r+1}}{(r+1)^2} + \frac{3ad^2ex^{r+1}}{r+1}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*d^3*n*x + b*d^3*x*log(c*x^n) + a*d^3*x + b*e^3*x^(3*r + 1)*log(c*x^n)/(
3*r + 1) + 3*b*d*e^2*x^(2*r + 1)*log(c*x^n)/(2*r + 1) + 3*b*d^2*e*x^(r + 1
)*log(c*x^n)/(r + 1) - b*e^3*n*x^(3*r + 1)/(3*r + 1)^2 + a*e^3*x^(3*r + 1)
/(3*r + 1) - 3*b*d*e^2*n*x^(2*r + 1)/(2*r + 1)^2 + 3*a*d*e^2*x^(2*r + 1)/(
2*r + 1) - 3*b*d^2*e*n*x^(r + 1)/(r + 1)^2 + 3*a*d^2*e*x^(r + 1)/(r + 1)
```

3.400.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 379 vs. $2(169) = 338$.

Time = 0.31 (sec) , antiderivative size = 379, normalized size of antiderivative = 2.24

$$\int (d+ex^r)^3 (a+b\log(cx^n))\,dx = \frac{3\,be^3nrxx^{3\,r}\log(x)}{9\,r^2+6\,r+1} + \frac{6\,bde^2nrxx^{2\,r}\log(x)}{4\,r^2+4\,r+1} + \frac{3\,bd^2enrxx^r\log(x)}{r^2+2\,r+1} + bd^3nx\log(x) + \frac{be^3nxx^{3\,r}\log(x)}{9\,r^2+6\,r+1} + \frac{3\,bde^2nxx^{2\,r}\log(x)}{4\,r^2+4\,r+1} + \frac{3\,bd^2enxx^r\log(x)}{r^2+2\,r+1} - bd^3nx - \frac{be^3nxx^{3\,r}}{9\,r^2+6\,r+1} - \frac{3\,bde^2nxx^{2\,r}}{4\,r^2+4\,r+1} - \frac{3\,bd^2enxx^r}{r^2+2\,r+1} + bd^3x\log(c) + \frac{be^3xx^{3\,r}\log(c)}{3\,r+1} + \frac{3\,bde^2xx^{2\,r}\log(c)}{2\,r+1} + \frac{3\,bd^2exx^r\log(c)}{r+1} + ad^3x + \frac{ae^3xx^{3\,r}}{3\,r+1} + \frac{3\,ade^2xx^{2\,r}}{2\,r+1} + \frac{3\,ad^2exx^r}{r+1}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
3*b*e^3*n*r*x*x^(3*r)*log(x)/(9*r^2 + 6*r + 1) + 6*b*d*e^2*n*r*x*x^(2*r)*l
og(x)/(4*r^2 + 4*r + 1) + 3*b*d^2*e*n*r*x*x^r*log(x)/(r^2 + 2*r + 1) + b*d
^3*n*x*log(x) + b*e^3*n*x*x^(3*r)*log(x)/(9*r^2 + 6*r + 1) + 3*b*d*e^2*n*x
*x^(2*r)*log(x)/(4*r^2 + 4*r + 1) + 3*b*d^2*e*n*x*x^r*log(x)/(r^2 + 2*r +
1) - b*d^3*n*x - b*e^3*n*x*x^(3*r)/(9*r^2 + 6*r + 1) - 3*b*d*e^2*n*x*x^(2*
r)/(4*r^2 + 4*r + 1) - 3*b*d^2*e*n*x*x^r/(r^2 + 2*r + 1) + b*d^3*x*log(c)
+ b*e^3*x*x^(3*r)*log(c)/(3*r + 1) + 3*b*d*e^2*x*x^(2*r)*log(c)/(2*r + 1)
+ 3*b*d^2*e*x*x^r*log(c)/(r + 1) + a*d^3*x + a*e^3*x*x^(3*r)/(3*r + 1) + 3
*a*d*e^2*x*x^(2*r)/(2*r + 1) + 3*a*d^2*e*x*x^r/(r + 1)
```

3.400.9 Mupad [F(-1)]

Timed out.

$$\int (d+ex^r)^3 (a+b\log(cx^n)) \, dx = \int (d+e\,x^r)^3 \,(a+b\,\ln(c\,x^n)) \, dx$$

input
```
int((d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int((d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.401 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^2} \, dx$

3.401.1 Optimal result

Integrand size = 23, antiderivative size = 179

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2} \, dx = -\frac{bd^3n}{x} - \frac{3bd^2enx^{-1+r}}{(1-r)^2} - \frac{3bde^2nx^{-1+2r}}{(1-2r)^2} - \frac{be^3nx^{-1+3r}}{(1-3r)^2} - \frac{d^3(a+b\log(cx^n))}{x} - \frac{3d^2ex^{-1+r}(a+b\log(cx^n))}{1-r} - \frac{3de^2x^{-1+2r}(a+b\log(cx^n))}{1-2r} - \frac{e^3x^{-1+3r}(a+b\log(cx^n))}{1-3r}$$

output
```
-b*d^3*n/x-3*b*d^2*e*n*x^(-1+r)/(1-r)^2-3*b*d*e^2*n*x^(-1+2*r)/(1-2*r)^2-b
*e^3*n*x^(-1+3*r)/(1-3*r)^2-d^3*(a+b*ln(c*x^n))/x-3*d^2*e*x^(-1+r)*(a+b*ln
(c*x^n))/(1-r)-3*d*e^2*x^(-1+2*r)*(a+b*ln(c*x^n))/(1-2*r)-e^3*x^(-1+3*r)*(
a+b*ln(c*x^n))/(1-3*r)
```

3.401.2 Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 181, normalized size of antiderivative = 1.01

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2} \, dx = \frac{bn\left(-d^3 - \frac{3d^2ex^r}{(-1+r)^2} - \frac{3de^2x^{2r}}{(1-2r)^2} - \frac{e^3x^{3r}}{(1-3r)^2}\right) + a\left(-d^3 + \frac{3d^2ex^r}{-1+r} + \frac{3de^2x^{2r}}{-1+2r} + \frac{e^3x^{3r}}{-1+3r}\right) + b\left(-d^3 + \frac{3d^2ex^r}{-1+r} + \frac{3de^2x^{2r}}{-1+2r} + \right.}{x}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
(b*n*(-d^3 - (3*d^2*e*x^r)/(-1 + r)^2 - (3*d*e^2*x^(2*r))/(1 - 2*r)^2 - (e
^3*x^(3*r))/(1 - 3*r)^2) + a*(-d^3 + (3*d^2*e*x^r)/(-1 + r) + (3*d*e^2*x^(
2*r))/(-1 + 2*r) + (e^3*x^(3*r))/(-1 + 3*r)) + b*(-d^3 + (3*d^2*e*x^r)/(-1
 + r) + (3*d*e^2*x^(2*r))/(-1 + 2*r) + (e^3*x^(3*r))/(-1 + 3*r))*Log[c*x^n
])/x
```

3.401.3 Rubi [A] (verified)

Time = 0.61 (sec) , antiderivative size = 175, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 25, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2} \, dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{3d^2ex^r}{1-r}+\frac{3de^2x^{2r}}{1-2r}+\frac{e^3x^{3r}}{1-3r}+d^3}{x^2}dx-\frac{d^3(a+b\log(cx^n))}{x}-\frac{3d^2ex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{3de^2x^{2r-1}(a+b\log(cx^n))}{1-2r}-\frac{e^3x^{3r-1}(a+b\log(cx^n))}{1-3r}$$

$$\Big\downarrow \text{25}$$

$$bn\int \frac{\frac{3d^2ex^r}{1-r}+\frac{3de^2x^{2r}}{1-2r}+\frac{e^3x^{3r}}{1-3r}+d^3}{x^2}dx-\frac{d^3(a+b\log(cx^n))}{x}-\frac{3d^2ex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{3de^2x^{2r-1}(a+b\log(cx^n))}{1-2r}-\frac{e^3x^{3r-1}(a+b\log(cx^n))}{1-3r}$$

$$\Big\downarrow \text{2010}$$

$$bn\int \left(-\frac{3d^2ex^{r-2}}{r-1}+\frac{3de^2x^{2(r-1)}}{1-2r}-\frac{e^3x^{3r-2}}{3r-1}+\frac{d^3}{x^2}\right)dx-\frac{d^3(a+b\log(cx^n))}{x}-\frac{3d^2ex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{3de^2x^{2r-1}(a+b\log(cx^n))}{1-2r}-\frac{e^3x^{3r-1}(a+b\log(cx^n))}{1-3r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{x}-\frac{3d^2ex^{r-1}(a+b\log(cx^n))}{1-r}-\frac{3de^2x^{2r-1}(a+b\log(cx^n))}{1-2r}-\frac{e^3x^{3r-1}(a+b\log(cx^n))}{1-3r}+bn\left(-\frac{d^3}{x}-\frac{3d^2ex^{r-1}}{(1-r)^2}-\frac{3de^2x^{2r-1}}{(1-2r)^2}-\frac{e^3x^{3r-1}}{(1-3r)^2}\right)$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^2,x]
```

output
```
b*n*(-(d^3/x) - (3*d^2*e*x^(-1 + r))/(1 - r)^2 - (3*d*e^2*x^(-1 + 2*r))/(1
 - 2*r)^2 - (e^3*x^(-1 + 3*r))/(1 - 3*r)^2) - (d^3*(a + b*Log[c*x^n]))/x -
 (3*d^2*e*x^(-1 + r)*(a + b*Log[c*x^n]))/(1 - r) - (3*d*e^2*x^(-1 + 2*r)*(
a + b*Log[c*x^n]))/(1 - 2*r) - (e^3*x^(-1 + 3*r)*(a + b*Log[c*x^n]))/(1 -
3*r)
```

3.401.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.401.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1034 vs. 2(179) = 358.

Time = 3.77 (sec) , antiderivative size = 1035, normalized size of antiderivative = 5.78

method	result	size
parallelrisch	Expression too large to display	1035
risch	Expression too large to display	4031

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^2,x,method=_RETURNVERBOSE)
```

output
```
-(b*ln(c*x^n)*d^3+3*b*d*e^2*ln(c*x^n)*(x^r)^2+e^3*(x^r)^3*a-144*b*d^3*n*r^
3+58*b*d^3*n*r^2-12*b*d^3*n*r+114*a*d*e^2*r^2*(x^r)^2-204*a*d*e^2*r^3*(x^r
)^2+3*d*e^2*(x^r)^2*a+3*d^2*e*x^r*a+a*d^3-51*a*e^3*r^3*(x^r)^3+31*a*e^3*r^
2*(x^r)^3-9*a*e^3*r*(x^r)^3-12*a*e^3*r^5*(x^r)^3+40*a*e^3*r^4*(x^r)^3-12*(
x^r)^3*ln(c*x^n)*b*e^3*r^5+40*(x^r)^3*ln(c*x^n)*b*e^3*r^4-51*(x^r)^3*ln(c*
x^n)*b*e^3*r^3+31*(x^r)^3*ln(c*x^n)*b*e^3*r^2-9*(x^r)^3*ln(c*x^n)*b*e^3*r+
3*b*d^2*e*ln(c*x^n)*x^r+36*b*d^3*n*r^6-132*b*d^3*n*r^5+193*b*d^3*n*r^4-108
*x^r*ln(c*x^n)*b*d^2*e*r^5+288*x^r*ln(c*x^n)*b*d^2*e*r^4-291*x^r*ln(c*x^n)
*b*d^2*e*r^3+141*x^r*ln(c*x^n)*b*d^2*e*r^2-33*x^r*ln(c*x^n)*b*d^2*e*r-54*(
x^r)^2*ln(c*x^n)*b*d*e^2*r^5+171*(x^r)^2*ln(c*x^n)*b*d*e^2*r^4-204*(x^r)^2
*ln(c*x^n)*b*d*e^2*r^3+114*(x^r)^2*ln(c*x^n)*b*d*e^2*r^2-30*(x^r)^2*ln(c*x
^n)*b*d*e^2*r+b*d^3*n+36*ln(c*x^n)*b*d^3*r^6-132*ln(c*x^n)*b*d^3*r^5+193*l
n(c*x^n)*b*d^3*r^4-144*ln(c*x^n)*b*d^3*r^3+58*ln(c*x^n)*b*d^3*r^2-12*ln(c*
x^n)*b*d^3*r+e^3*b*ln(c*x^n)*(x^r)^3-144*a*d^3*r^3+58*a*d^3*r^2-12*a*d^3*r
+36*a*d^3*r^6-132*a*d^3*r^5+193*a*d^3*r^4-291*a*d^2*e*r^3*x^r+3*b*d*e^2*n*
(x^r)^2+3*b*d^2*e*n*x^r+b*e^3*n*(x^r)^3-12*b*e^3*n*r^3*(x^r)^3+13*b*e^3*n*
r^2*(x^r)^3-6*b*e^3*n*r*(x^r)^3+141*a*d^2*e*r^2*x^r+288*a*d^2*e*r^4*x^r-33
*a*d^2*e*r*x^r+4*b*e^3*n*r^4*(x^r)^3-30*a*d*e^2*r*(x^r)^2-54*a*d*e^2*r^5*(
x^r)^2+171*a*d*e^2*r^4*(x^r)^2-108*a*d^2*e*r^5*x^r+66*b*d*e^2*n*r^2*(x^r)^
2+111*b*d^2*e*n*r^2*x^r-24*b*d*e^2*n*r*(x^r)^2-30*b*d^2*e*n*r*x^r-180*b...
```

3.401.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 967 vs. $2(174) = 348$.

Time = 0.31 (sec) , antiderivative size = 967, normalized size of antiderivative = 5.40

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2} \, dx = -\frac{36\,(bd^3n+ad^3)r^6 - 132\,(bd^3n+ad^3)r^5 + bd^3n + 193\,(bd^3n+ad^3)r^4 + ad^3 - 144\,(bd^3n+ad^3)r^3 + 58\,(}{}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^2,x, algorithm="fricas")
```

output
```
-(36*(b*d^3*n + a*d^3)*r^6 - 132*(b*d^3*n + a*d^3)*r^5 + b*d^3*n + 193*(b*
d^3*n + a*d^3)*r^4 + a*d^3 - 144*(b*d^3*n + a*d^3)*r^3 + 58*(b*d^3*n + a*d
^3)*r^2 - 12*(b*d^3*n + a*d^3)*r - (12*a*e^3*r^5 - b*e^3*n - 4*(b*e^3*n +
10*a*e^3)*r^4 - a*e^3 + 3*(4*b*e^3*n + 17*a*e^3)*r^3 - (13*b*e^3*n + 31*a*
e^3)*r^2 + 3*(2*b*e^3*n + 3*a*e^3)*r + (12*b*e^3*r^5 - 40*b*e^3*r^4 + 51*b
*e^3*r^3 - 31*b*e^3*r^2 + 9*b*e^3*r - b*e^3)*log(c) + (12*b*e^3*n*r^5 - 40
*b*e^3*n*r^4 + 51*b*e^3*n*r^3 - 31*b*e^3*n*r^2 + 9*b*e^3*n*r - b*e^3*n)*lo
g(x))*x^(3*r) - 3*(18*a*d*e^2*r^5 - b*d*e^2*n - 3*(3*b*d*e^2*n + 19*a*d*e^
2)*r^4 - a*d*e^2 + 4*(6*b*d*e^2*n + 17*a*d*e^2)*r^3 - 2*(11*b*d*e^2*n + 19
*a*d*e^2)*r^2 + 2*(4*b*d*e^2*n + 5*a*d*e^2)*r + (18*b*d*e^2*r^5 - 57*b*d*e
^2*r^4 + 68*b*d*e^2*r^3 - 38*b*d*e^2*r^2 + 10*b*d*e^2*r - b*d*e^2)*log(c)
+ (18*b*d*e^2*n*r^5 - 57*b*d*e^2*n*r^4 + 68*b*d*e^2*n*r^3 - 38*b*d*e^2*n*r
^2 + 10*b*d*e^2*n*r - b*d*e^2*n)*log(x))*x^(2*r) - 3*(36*a*d^2*e*r^5 - b*d
^2*e*n - 12*(3*b*d^2*e*n + 8*a*d^2*e)*r^4 - a*d^2*e + (60*b*d^2*e*n + 97*a
*d^2*e)*r^3 - (37*b*d^2*e*n + 47*a*d^2*e)*r^2 + (10*b*d^2*e*n + 11*a*d^2*e
)*r + (36*b*d^2*e*r^5 - 96*b*d^2*e*r^4 + 97*b*d^2*e*r^3 - 47*b*d^2*e*r^2 +
 11*b*d^2*e*r - b*d^2*e)*log(c) + (36*b*d^2*e*n*r^5 - 96*b*d^2*e*n*r^4 + 9
7*b*d^2*e*n*r^3 - 47*b*d^2*e*n*r^2 + 11*b*d^2*e*n*r - b*d^2*e*n)*log(x))*x
^r + (36*b*d^3*r^6 - 132*b*d^3*r^5 + 193*b*d^3*r^4 - 144*b*d^3*r^3 + 58*b*
d^3*r^2 - 12*b*d^3*r + b*d^3)*log(c) + (36*b*d^3*n*r^6 - 132*b*d^3*n*r^...
```

3.401.6 Sympy [A] (verification not implemented)

Time = 10.76 (sec) , antiderivative size = 323, normalized size of antiderivative = 1.80

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2}\,dx$$

$$= -\frac{ad^3}{x} + 3ad^2e\left(\begin{cases}\frac{x^r}{rx-x} & \text{for } r\neq 1\\ \frac{x^r\log(x)}{x} & \text{otherwise}\end{cases}\right) + 3ade^2\left(\begin{cases}\frac{x^{2r}}{2rx-x} & \text{for } r\neq \frac{1}{2}\\ \frac{x^{2r}\log(x)}{x} & \text{otherwise}\end{cases}\right)$$
$$+ ae^3\left(\begin{cases}\frac{x^{3r}}{3rx-x} & \text{for } r\neq \frac{1}{3}\\ \frac{x^{3r}\log(x)}{x} & \text{otherwise}\end{cases}\right) - \frac{bd^3n}{x} - \frac{bd^3\log(cx^n)}{x}$$
$$- 3bd^2en\left(\begin{cases}\frac{\begin{cases}\frac{x^{r-1}}{r-1} & \text{for } r\neq 1\\ \log(x) & \text{otherwise}\end{cases}}{r-1} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq 1\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 3bd^2e\left(\begin{cases}\frac{x^{r-1}}{r-1} & \text{for } r\neq 1\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$
$$- 3bde^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r-1}}{2r-1} & \text{for } r\neq \frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r-1} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq \frac{1}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 3bde^2\left(\begin{cases}\frac{x^{2r-1}}{2r-1} & \text{for } r\neq \frac{1}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$
$$- be^3n\left(\begin{cases}\frac{\begin{cases}\frac{x^{3r-1}}{3r-1} & \text{for } r\neq \frac{1}{3}\\ \log(x) & \text{otherwise}\end{cases}}{3r-1} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq \frac{1}{3}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ be^3\left(\begin{cases}\frac{x^{3r-1}}{3r-1} & \text{for } r\neq \frac{1}{3}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**2,x)
```

output
```
-a*d**3/x + 3*a*d**2*e*Piecewise((x**r/(r*x - x), Ne(r, 1)), (x**r*log(x)/
x, True)) + 3*a*d*e**2*Piecewise((x**(2*r)/(2*r*x - x), Ne(r, 1/2)), (x**(
2*r)*log(x)/x, True)) + a*e**3*Piecewise((x**(3*r)/(3*r*x - x), Ne(r, 1/3)
), (x**(3*r)*log(x)/x, True)) - b*d**3*n/x - b*d**3*log(c*x**n)/x - 3*b*d*
*2*e*n*Piecewise((Piecewise((x**(r - 1)/(r - 1), Ne(r, 1)), (log(x), True)
)/(r - 1), (r > -oo) & (r < oo) & Ne(r, 1)), (log(x)**2/2, True)) + 3*b*d*
*2*e*Piecewise((x**(r - 1)/(r - 1), Ne(r, 1)), (log(x), True))*log(c*x**n)
 - 3*b*d*e**2*n*Piecewise((Piecewise((x**(2*r - 1)/(2*r - 1), Ne(r, 1/2)),
 (log(x), True))/(2*r - 1), (r > -oo) & (r < oo) & Ne(r, 1/2)), (log(x)**2
/2, True)) + 3*b*d*e**2*Piecewise((x**(2*r - 1)/(2*r - 1), Ne(r, 1/2)), (l
og(x), True))*log(c*x**n) - b*e**3*n*Piecewise((Piecewise((x**(3*r - 1)/(3
*r - 1), Ne(r, 1/3)), (log(x), True))/(3*r - 1), (r > -oo) & (r < oo) & Ne
(r, 1/3)), (log(x)**2/2, True)) + b*e**3*Piecewise((x**(3*r - 1)/(3*r - 1)
, Ne(r, 1/3)), (log(x), True))*log(c*x**n)
```

3.401.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2} dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^2,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-2>0)', see `assume?` for more
details)Is
```

3.401.8 Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2} dx = \int \frac{(ex^r+d)^3 (b\log(cx^n)+a)}{x^2} dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^2,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^2, x)
```

3.401.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^2}\,dx = \int \frac{(d+e\,x^r)^3 \left(a+b\,\ln\left(c\,x^n\right)\right)}{x^2}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^2,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^2, x)
```

3.402 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^4} dx$

3.402.1 Optimal result

Integrand size = 23, antiderivative size = 191

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^4} dx = -\frac{bd^3n}{9x^3} - \frac{be^3nx^{-3(1-r)}}{9(1-r)^2} - \frac{3bd^2enx^{-3+r}}{(3-r)^2} - \frac{3bde^2nx^{-3+2r}}{(3-2r)^2} - \frac{d^3(a+b\log(cx^n))}{3x^3} - \frac{e^3x^{-3(1-r)}(a+b\log(cx^n))}{3(1-r)} - \frac{3d^2ex^{-3+r}(a+b\log(cx^n))}{3-r} - \frac{3de^2x^{-3+2r}(a+b\log(cx^n))}{3-2r}$$

output
```
-1/9*b*d^3*n/x^3-1/9*b*e^3*n/(1-r)^2/(x^(3-3*r))-3*b*d^2*e*n*x^(-3+r)/(3-r
)^2-3*b*d*e^2*n*x^(-3+2*r)/(3-2*r)^2-1/3*d^3*(a+b*ln(c*x^n))/x^3-1/3*e^3*(
a+b*ln(c*x^n))/(1-r)/(x^(3-3*r))-3*d^2*e*x^(-3+r)*(a+b*ln(c*x^n))/(3-r)-3*
d*e^2*x^(-3+2*r)*(a+b*ln(c*x^n))/(3-2*r)
```

3.402.2 Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 180, normalized size of antiderivative = 0.94

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^4}\,dx$$
$$=\frac{bn\left(-d^3-\frac{27d^2ex^r}{(-3+r)^2}-\frac{27de^2x^{2r}}{(3-2r)^2}-\frac{e^3x^{3r}}{(-1+r)^2}\right)+3a\left(-d^3+\frac{9d^2ex^r}{-3+r}+\frac{9de^2x^{2r}}{-3+2r}+\frac{e^3x^{3r}}{-1+r}\right)+3b\left(-d^3+\frac{9d^2ex^r}{-3+r}+\frac{9de^2x^{2r}}{-3+2r}\right.}{9x^3}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-d^3 - (27*d^2*e*x^r)/(-3 + r)^2 - (27*d*e^2*x^(2*r))/(3 - 2*r)^2 -
(e^3*x^(3*r))/(-1 + r)^2) + 3*a*(-d^3 + (9*d^2*e*x^r)/(-3 + r) + (9*d*e^2*
x^(2*r))/(-3 + 2*r) + (e^3*x^(3*r))/(-1 + r)) + 3*b*(-d^3 + (9*d^2*e*x^r)/
(-3 + r) + (9*d*e^2*x^(2*r))/(-3 + 2*r) + (e^3*x^(3*r))/(-1 + r))*Log[c*x^
n])/(9*x^3)
```

3.402.3 Rubi [A] (verified)

Time = 0.62 (sec) , antiderivative size = 190, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^4}\,dx$$
$$\Big\downarrow \ 2772$$
$$-bn\int -\frac{\frac{9d^2ex^r}{3-r}+\frac{9de^2x^{2r}}{3-2r}+\frac{e^3x^{3r}}{1-r}+d^3}{3x^4}dx-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2ex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{3de^2x^{2r-3}(a+b\log(cx^n))}{3-2r}-\frac{e^3x^{-3(1-r)}(a+b\log(cx^n))}{3(1-r)}$$
$$\Big\downarrow \ 27$$
$$\frac{1}{3}bn\int \frac{\frac{9d^2ex^r}{3-r}+\frac{9de^2x^{2r}}{3-2r}+\frac{e^3x^{3r}}{1-r}+d^3}{x^4}dx-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2ex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{3de^2x^{2r-3}(a+b\log(cx^n))}{3-2r}-\frac{e^3x^{-3(1-r)}(a+b\log(cx^n))}{3(1-r)}$$

$$\downarrow \text{2010}$$

$$\frac{1}{3}bn\int\left(-\frac{9d^2ex^{r-4}}{r-3}+\frac{9de^2x^{2(r-2)}}{3-2r}-\frac{e^3x^{3r-4}}{r-1}+\frac{d^3}{x^4}\right)dx-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2ex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{3de^2x^{2r-3}(a+b\log(cx^n))}{3-2r}-\frac{e^3x^{-3(1-r)}(a+b\log(cx^n))}{3(1-r)}$$

$$\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{3x^3}-\frac{3d^2ex^{r-3}(a+b\log(cx^n))}{3-r}-\frac{3de^2x^{2r-3}(a+b\log(cx^n))}{3-2r}-\frac{e^3x^{-3(1-r)}(a+b\log(cx^n))}{3(1-r)}+\frac{1}{3}bn\left(-\frac{d^3}{3x^3}-\frac{9d^2ex^{r-3}}{(3-r)^2}-\frac{9de^2x^{2r-3}}{(3-2r)^2}-\frac{e^3x^{-3(1-r)}}{3(1-r)^2}\right)$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^4,x]
```

output
```
(b*n*(-1/3*d^3/x^3 - e^3/(3*(1 - r)^2*x^(3*(1 - r))) - (9*d^2*e*x^(-3 + r)
)/(3 - r)^2 - (9*d*e^2*x^(-3 + 2*r))/(3 - 2*r)^2))/3 - (d^3*(a + b*Log[c*x
^n]))/(3*x^3) - (e^3*(a + b*Log[c*x^n]))/(3*(1 - r)*x^(3*(1 - r))) - (3*d^
2*e*x^(-3 + r)*(a + b*Log[c*x^n]))/(3 - r) - (3*d*e^2*x^(-3 + 2*r)*(a + b*
Log[c*x^n]))/(3 - 2*r)
```

3.402.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.402. $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^4}\,dx$

3.402.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1038 vs. 2(183) = 366.

Time = 3.47 (sec) , antiderivative size = 1039, normalized size of antiderivative = 5.44

method	result	size
parallelrisch	Expression too large to display	1039
risch	Expression too large to display	4027

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^4,x,method=_RETURNVERBOSE)
```

output
```
-1/9*(243*b*ln(c*x^n)*d^3+729*b*d*e^2*ln(c*x^n)*(x^r)^2+243*e^3*(x^r)^3*a-
432*b*d^3*n*r^3+522*b*d^3*n*r^2-324*b*d^3*n*r+3078*a*d*e^2*r^2*(x^r)^2-183
6*a*d*e^2*r^3*(x^r)^2+729*d*e^2*(x^r)^2*a+729*d^2*e*x^r*a+243*a*d^3-459*a*
e^3*r^3*(x^r)^3+837*a*e^3*r^2*(x^r)^3-729*a*e^3*r*(x^r)^3-12*a*e^3*r^5*(x^
r)^3+120*a*e^3*r^4*(x^r)^3-12*(x^r)^3*ln(c*x^n)*b*e^3*r^5+120*(x^r)^3*ln(c
*x^n)*b*e^3*r^4-459*(x^r)^3*ln(c*x^n)*b*e^3*r^3+837*(x^r)^3*ln(c*x^n)*b*e^
3*r^2-729*(x^r)^3*ln(c*x^n)*b*e^3*r+729*b*d^2*e*ln(c*x^n)*x^r+4*b*d^3*n*r^
6-44*b*d^3*n*r^5+193*b*d^3*n*r^4-108*x^r*ln(c*x^n)*b*d^2*e*r^5+864*x^r*ln(
c*x^n)*b*d^2*e*r^4-2619*x^r*ln(c*x^n)*b*d^2*e*r^3+3807*x^r*ln(c*x^n)*b*d^2
*e*r^2-2673*x^r*ln(c*x^n)*b*d^2*e*r-54*(x^r)^2*ln(c*x^n)*b*d*e^2*r^5+513*(
x^r)^2*ln(c*x^n)*b*d*e^2*r^4-1836*(x^r)^2*ln(c*x^n)*b*d*e^2*r^3+3078*(x^r)
^2*ln(c*x^n)*b*d*e^2*r^2-2430*(x^r)^2*ln(c*x^n)*b*d*e^2*r+81*b*d^3*n+12*ln
(c*x^n)*b*d^3*r^6-132*ln(c*x^n)*b*d^3*r^5+579*ln(c*x^n)*b*d^3*r^4-1296*ln(
c*x^n)*b*d^3*r^3+1566*ln(c*x^n)*b*d^3*r^2-972*ln(c*x^n)*b*d^3*r+243*e^3*b*
ln(c*x^n)*(x^r)^3-1296*a*d^3*r^3+1566*a*d^3*r^2-972*a*d^3*r+12*a*d^3*r^6-1
32*a*d^3*r^5+579*a*d^3*r^4-2619*a*d^2*e*r^3*x^r+243*b*d*e^2*n*(x^r)^2+243*
b*d^2*e*n*x^r+81*b*e^3*n*(x^r)^3-36*b*e^3*n*r^3*(x^r)^3+117*b*e^3*n*r^2*(x
^r)^3-162*b*e^3*n*r*(x^r)^3+3807*a*d^2*e*r^2*x^r+864*a*d^2*e*r^4*x^r-2673*
a*d^2*e*r*x^r+4*b*e^3*n*r^4*(x^r)^3-2430*a*d*e^2*r*(x^r)^2-54*a*d*e^2*r^5*
(x^r)^2+513*a*d*e^2*r^4*(x^r)^2-108*a*d^2*e*r^5*x^r+594*b*d*e^2*n*r^2*(...
```

3.402.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 980 vs. $2(175) = 350$.

Time = 0.34 (sec) , antiderivative size = 980, normalized size of antiderivative = 5.13

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^4} dx = -\frac{4(bd^3n+3ad^3)r^6 - 44(bd^3n+3ad^3)r^5 + 81bd^3n + 193(bd^3n+3ad^3)r^4 + 243ad^3 - 432(bd^3n+3a}{}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^4,x, algorithm="fricas")
```

output
```
-1/9*(4*(b*d^3*n + 3*a*d^3)*r^6 - 44*(b*d^3*n + 3*a*d^3)*r^5 + 81*b*d^3*n
+ 193*(b*d^3*n + 3*a*d^3)*r^4 + 243*a*d^3 - 432*(b*d^3*n + 3*a*d^3)*r^3 +
522*(b*d^3*n + 3*a*d^3)*r^2 - 324*(b*d^3*n + 3*a*d^3)*r - (12*a*e^3*r^5 -
81*b*e^3*n - 4*(b*e^3*n + 30*a*e^3)*r^4 - 243*a*e^3 + 9*(4*b*e^3*n + 51*a*
e^3)*r^3 - 9*(13*b*e^3*n + 93*a*e^3)*r^2 + 81*(2*b*e^3*n + 9*a*e^3)*r + 3*
(4*b*e^3*r^5 - 40*b*e^3*r^4 + 153*b*e^3*r^3 - 279*b*e^3*r^2 + 243*b*e^3*r
- 81*b*e^3)*log(c) + 3*(4*b*e^3*n*r^5 - 40*b*e^3*n*r^4 + 153*b*e^3*n*r^3 -
 279*b*e^3*n*r^2 + 243*b*e^3*n*r - 81*b*e^3*n)*log(x))*x^(3*r) - 27*(2*a*d
*e^2*r^5 - 9*b*d*e^2*n - (b*d*e^2*n + 19*a*d*e^2)*r^4 - 27*a*d*e^2 + 4*(2*
b*d*e^2*n + 17*a*d*e^2)*r^3 - 2*(11*b*d*e^2*n + 57*a*d*e^2)*r^2 + 6*(4*b*d
*e^2*n + 15*a*d*e^2)*r + (2*b*d*e^2*r^5 - 19*b*d*e^2*r^4 + 68*b*d*e^2*r^3
- 114*b*d*e^2*r^2 + 90*b*d*e^2*r - 27*b*d*e^2)*log(c) + (2*b*d*e^2*n*r^5 -
 19*b*d*e^2*n*r^4 + 68*b*d*e^2*n*r^3 - 114*b*d*e^2*n*r^2 + 90*b*d*e^2*n*r
- 27*b*d*e^2*n)*log(x))*x^(2*r) - 27*(4*a*d^2*e*r^5 - 9*b*d^2*e*n - 4*(b*d
^2*e*n + 8*a*d^2*e)*r^4 - 27*a*d^2*e + (20*b*d^2*e*n + 97*a*d^2*e)*r^3 - (
37*b*d^2*e*n + 141*a*d^2*e)*r^2 + 3*(10*b*d^2*e*n + 33*a*d^2*e)*r + (4*b*d
^2*e*r^5 - 32*b*d^2*e*r^4 + 97*b*d^2*e*r^3 - 141*b*d^2*e*r^2 + 99*b*d^2*e*
r - 27*b*d^2*e)*log(c) + (4*b*d^2*e*n*r^5 - 32*b*d^2*e*n*r^4 + 97*b*d^2*e*
n*r^3 - 141*b*d^2*e*n*r^2 + 99*b*d^2*e*n*r - 27*b*d^2*e*n)*log(x))*x^r + 3
*(4*b*d^3*r^6 - 44*b*d^3*r^5 + 193*b*d^3*r^4 - 432*b*d^3*r^3 + 522*b*d^...
```

3.402.6 Sympy [A] (verification not implemented)

Time = 49.68 (sec) , antiderivative size = 347, normalized size of antiderivative = 1.82

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^4}\,dx$$
$$= -\frac{ad^3}{3x^3} + 3ad^2e\left(\begin{cases}\frac{x^r}{rx^3-3x^3} & \text{for } r\neq 3\\ \frac{x^r\log(x)}{x^3} & \text{otherwise}\end{cases}\right) + 3ade^2\left(\begin{cases}\frac{x^{2r}}{2rx^3-3x^3} & \text{for } r\neq \frac{3}{2}\\ \frac{x^{2r}\log(x)}{x^3} & \text{otherwise}\end{cases}\right)$$
$$+ ae^3\left(\begin{cases}\frac{x^{3r}}{3rx^3-3x^3} & \text{for } r\neq 1\\ \frac{x^{3r}\log(x)}{x^3} & \text{otherwise}\end{cases}\right) - \frac{bd^3n}{9x^3} - \frac{bd^3\log(cx^n)}{3x^3}$$
$$- 3bd^2en\left(\begin{cases}\frac{\begin{cases}\frac{x^{r-3}}{r-3} & \text{for } r\neq 3\\ \log(x) & \text{otherwise}\end{cases}}{r-3} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq 3\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 3bd^2e\left(\begin{cases}\frac{x^{r-3}}{r-3} & \text{for } r\neq 3\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$
$$- 3bde^2n\left(\begin{cases}\frac{\begin{cases}\frac{x^{2r-3}}{2r-3} & \text{for } r\neq \frac{3}{2}\\ \log(x) & \text{otherwise}\end{cases}}{2r-3} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq \frac{3}{2}\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ 3bde^2\left(\begin{cases}\frac{x^{2r-3}}{2r-3} & \text{for } r\neq \frac{3}{2}\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$
$$- be^3n\left(\begin{cases}\frac{\begin{cases}\frac{x^{3r-3}}{3r-3} & \text{for } r\neq 1\\ \log(x) & \text{otherwise}\end{cases}}{3r-3} & \text{for } r>-\infty\wedge r<\infty\wedge r\neq 1\\ \frac{\log(x)^2}{2} & \text{otherwise}\end{cases}\right)$$
$$+ be^3\left(\begin{cases}\frac{x^{3r-3}}{3r-3} & \text{for } r\neq 1\\ \log(x) & \text{otherwise}\end{cases}\right)\log(cx^n)$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**4,x)
```

output
```
-a*d**3/(3*x**3) + 3*a*d**2*e*Piecewise((x**r/(r*x**3 - 3*x**3), Ne(r, 3))
, (x**r*log(x)/x**3, True)) + 3*a*d*e**2*Piecewise((x**(2*r)/(2*r*x**3 - 3
*x**3), Ne(r, 3/2)), (x**(2*r)*log(x)/x**3, True)) + a*e**3*Piecewise((x**
(3*r)/(3*r*x**3 - 3*x**3), Ne(r, 1)), (x**(3*r)*log(x)/x**3, True)) - b*d*
*3*n/(9*x**3) - b*d**3*log(c*x**n)/(3*x**3) - 3*b*d**2*e*n*Piecewise((Piec
ewise((x**(r - 3)/(r - 3), Ne(r, 3)), (log(x), True))/(r - 3), (r > -oo) &
 (r < oo) & Ne(r, 3)), (log(x)**2/2, True)) + 3*b*d**2*e*Piecewise((x**(r
- 3)/(r - 3), Ne(r, 3)), (log(x), True))*log(c*x**n) - 3*b*d*e**2*n*Piecew
ise((Piecewise((x**(2*r - 3)/(2*r - 3), Ne(r, 3/2)), (log(x), True))/(2*r
- 3), (r > -oo) & (r < oo) & Ne(r, 3/2)), (log(x)**2/2, True)) + 3*b*d*e**
2*Piecewise((x**(2*r - 3)/(2*r - 3), Ne(r, 3/2)), (log(x), True))*log(c*x*
*n) - b*e**3*n*Piecewise((Piecewise((x**(3*r - 3)/(3*r - 3), Ne(r, 1)), (l
og(x), True))/(3*r - 3), (r > -oo) & (r < oo) & Ne(r, 1)), (log(x)**2/2, T
rue)) + b*e**3*Piecewise((x**(3*r - 3)/(3*r - 3), Ne(r, 1)), (log(x), True
))*log(c*x**n)
```

3.402.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^4}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^4,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-4>0)', see `assume?` for more
details)Is
```

3.402.8 Giac [F]

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^4}\,dx = \int \frac{(ex^r+d)^3(b\log(cx^n)+a)}{x^4}\,dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^4,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^4, x)
```

3.402.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^4}\,dx = \int \frac{(d+e\,x^r)^3 (a+b\,\ln(c\,x^n))}{x^4}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^4,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^4, x)
```

3.403 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^6}\,dx$

3.403.1 Optimal result

Integrand size = 23, antiderivative size = 183

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^6}\,dx = -\frac{bd^3n}{25x^5}-\frac{3bd^2enx^{-5+r}}{(5-r)^2}-\frac{3bde^2nx^{-5+2r}}{(5-2r)^2}-\frac{be^3nx^{-5+3r}}{(5-3r)^2}-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{3d^2ex^{-5+r}(a+b\log(cx^n))}{5-r}-\frac{3de^2x^{-5+2r}(a+b\log(cx^n))}{5-2r}-\frac{e^3x^{-5+3r}(a+b\log(cx^n))}{5-3r}$$

output
```
-1/25*b*d^3*n/x^5-3*b*d^2*e*n*x^(-5+r)/(5-r)^2-3*b*d*e^2*n*x^(-5+2*r)/(5-2
*r)^2-b*e^3*n*x^(-5+3*r)/(5-3*r)^2-1/5*d^3*(a+b*ln(c*x^n))/x^5-3*d^2*e*x^(
-5+r)*(a+b*ln(c*x^n))/(5-r)-3*d*e^2*x^(-5+2*r)*(a+b*ln(c*x^n))/(5-2*r)-e^3
*x^(-5+3*r)*(a+b*ln(c*x^n))/(5-3*r)
```

3.403.2 Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 187, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^6}\,dx = \frac{bn\left(-d^3-\frac{75d^2ex^r}{(-5+r)^2}-\frac{75de^2x^{2r}}{(5-2r)^2}-\frac{25e^3x^{3r}}{(5-3r)^2}\right)+a\left(-5d^3+\frac{75d^2ex^r}{-5+r}+\frac{75de^2x^{2r}}{-5+2r}+\frac{25e^3x^{3r}}{-5+3r}\right)+5b\left(-d^3+\frac{15d^2ex^r}{-5+r}+\cdots\right.}{25x^5}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*(-d^3 - (75*d^2*e*x^r)/(-5 + r)^2 - (75*d*e^2*x^(2*r))/(5 - 2*r)^2 -
(25*e^3*x^(3*r))/(5 - 3*r)^2) + a*(-5*d^3 + (75*d^2*e*x^r)/(-5 + r) + (75*
d*e^2*x^(2*r))/(-5 + 2*r) + (25*e^3*x^(3*r))/(-5 + 3*r)) + 5*b*(-d^3 + (15
*d^2*e*x^r)/(-5 + r) + (15*d*e^2*x^(2*r))/(-5 + 2*r) + (5*e^3*x^(3*r))/(-5
 + 3*r))*Log[c*x^n])/(25*x^5)
```

3.403.3 Rubi [A] (verified)

Time = 0.64 (sec) , antiderivative size = 182, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^6} \, dx$$

$$\Big\downarrow \text{ 2772}$$

$$-bn\int -\frac{\frac{15d^2ex^r}{5-r}+\frac{15de^2x^{2r}}{5-2r}+\frac{5e^3x^{3r}}{5-3r}+d^3}{5x^6}dx-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{3d^2ex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{3de^2x^{2r-5}(a+b\log(cx^n))}{5-2r}-\frac{e^3x^{3r-5}(a+b\log(cx^n))}{5-3r}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{1}{5}bn\int \frac{\frac{15d^2ex^r}{5-r}+\frac{15de^2x^{2r}}{5-2r}+\frac{5e^3x^{3r}}{5-3r}+d^3}{x^6}dx-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{3d^2ex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{3de^2x^{2r-5}(a+b\log(cx^n))}{5-2r}-\frac{e^3x^{3r-5}(a+b\log(cx^n))}{5-3r}$$

$$\Big\downarrow \text{ 2010}$$

$$\frac{1}{5}bn\int \left(-\frac{15d^2ex^{r-6}}{r-5}+\frac{15de^2x^{2(r-3)}}{5-2r}+\frac{5e^3x^{3(r-2)}}{5-3r}+\frac{d^3}{x^6}\right)dx-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{3d^2ex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{3de^2x^{2r-5}(a+b\log(cx^n))}{5-2r}-\frac{e^3x^{3r-5}(a+b\log(cx^n))}{5-3r}$$

$$\Big\downarrow \text{ 2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{5x^5}-\frac{3d^2ex^{r-5}(a+b\log(cx^n))}{5-r}-\frac{3de^2x^{2r-5}(a+b\log(cx^n))}{5-2r}-\frac{e^3x^{3r-5}(a+b\log(cx^n))}{5-3r}+\frac{1}{5}bn\left(-\frac{d^3}{5x^5}-\frac{15d^2ex^{r-5}}{(5-r)^2}-\frac{15de^2x^{2r-5}}{(5-2r)^2}-\frac{5e^3x^{3r-5}}{(5-3r)^2}\right)$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^6,x]
```

output
```
(b*n*(-1/5*d^3/x^5 - (15*d^2*e*x^(-5 + r))/(5 - r)^2 - (15*d*e^2*x^(-5 + 2
*r))/(5 - 2*r)^2 - (5*e^3*x^(-5 + 3*r))/(5 - 3*r)^2))/5 - (d^3*(a + b*Log[
c*x^n]))/(5*x^5) - (3*d^2*e*x^(-5 + r)*(a + b*Log[c*x^n]))/(5 - r) - (3*d*
e^2*x^(-5 + 2*r)*(a + b*Log[c*x^n]))/(5 - 2*r) - (e^3*x^(-5 + 3*r)*(a + b*
Log[c*x^n]))/(5 - 3*r)
```

3.403.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.403.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1040 vs. $2(179) = 358$.

Time = 3.65 (sec) , antiderivative size = 1041, normalized size of antiderivative = 5.69

method	result	size
parallelrisch	Expression too large to display	1041
risch	Expression too large to display	4031

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^6,x,method=_RETURNVERBOSE)
```

output
```
-1/25*(78125*b*ln(c*x^n)*d^3+234375*b*d*e^2*ln(c*x^n)*(x^r)^2+78125*e^3*(x
^r)^3*a-18000*b*d^3*n*r^3+36250*b*d^3*n*r^2-37500*b*d^3*n*r+356250*a*d*e^2
*r^2*(x^r)^2-127500*a*d*e^2*r^3*(x^r)^2+234375*d*e^2*(x^r)^2*a+234375*d^2*
e*x^r*a+78125*a*d^3-31875*a*e^3*r^3*(x^r)^3+96875*a*e^3*r^2*(x^r)^3-140625
*a*e^3*r*(x^r)^3-300*a*e^3*r^5*(x^r)^3+5000*a*e^3*r^4*(x^r)^3-300*(x^r)^3*
ln(c*x^n)*b*e^3*r^5+5000*(x^r)^3*ln(c*x^n)*b*e^3*r^4-31875*(x^r)^3*ln(c*x^
n)*b*e^3*r^3+96875*(x^r)^3*ln(c*x^n)*b*e^3*r^2-140625*(x^r)^3*ln(c*x^n)*b*
e^3*r+234375*b*d^2*e*ln(c*x^n)*x^r+36*b*d^3*n*r^6-660*b*d^3*n*r^5+4825*b*d
^3*n*r^4-2700*x^r*ln(c*x^n)*b*d^2*e*r^5+36000*x^r*ln(c*x^n)*b*d^2*e*r^4-18
1875*x^r*ln(c*x^n)*b*d^2*e*r^3+440625*x^r*ln(c*x^n)*b*d^2*e*r^2-515625*x^r
*ln(c*x^n)*b*d^2*e*r-1350*(x^r)^2*ln(c*x^n)*b*d*e^2*r^5+21375*(x^r)^2*ln(c
*x^n)*b*d*e^2*r^4-127500*(x^r)^2*ln(c*x^n)*b*d*e^2*r^3+356250*(x^r)^2*ln(c
*x^n)*b*d*e^2*r^2-468750*(x^r)^2*ln(c*x^n)*b*d*e^2*r+15625*b*d^3*n+180*ln(
c*x^n)*b*d^3*r^6-3300*ln(c*x^n)*b*d^3*r^5+24125*ln(c*x^n)*b*d^3*r^4-90000*
ln(c*x^n)*b*d^3*r^3+181250*ln(c*x^n)*b*d^3*r^2-187500*ln(c*x^n)*b*d^3*r+78
125*e^3*b*ln(c*x^n)*(x^r)^3-90000*a*d^3*r^3+181250*a*d^3*r^2-187500*a*d^3*
r+180*a*d^3*r^6-3300*a*d^3*r^5+24125*a*d^3*r^4-181875*a*d^2*e*r^3*x^r+4687
5*b*d*e^2*n*(x^r)^2+46875*b*d^2*e*n*x^r+15625*b*e^3*n*(x^r)^3-1500*b*e^3*n
*r^3*(x^r)^3+8125*b*e^3*n*r^2*(x^r)^3-18750*b*e^3*n*r*(x^r)^3+440625*a*d^2
*e*r^2*x^r+36000*a*d^2*e*r^4*x^r-515625*a*d^2*e*r*x^r+100*b*e^3*n*r^4*(...
```

3.403.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 981 vs. $2(174) = 348$.

Time = 0.36 (sec) , antiderivative size = 981, normalized size of antiderivative = 5.36

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^6} dx = \text{Too large to display}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^6,x, algorithm="fricas")
```

output
```
-1/25*(36*(b*d^3*n + 5*a*d^3)*r^6 - 660*(b*d^3*n + 5*a*d^3)*r^5 + 15625*b*
d^3*n + 4825*(b*d^3*n + 5*a*d^3)*r^4 + 78125*a*d^3 - 18000*(b*d^3*n + 5*a*
d^3)*r^3 + 36250*(b*d^3*n + 5*a*d^3)*r^2 - 37500*(b*d^3*n + 5*a*d^3)*r - 2
5*(12*a*e^3*r^5 - 625*b*e^3*n - 4*(b*e^3*n + 50*a*e^3)*r^4 - 3125*a*e^3 +
15*(4*b*e^3*n + 85*a*e^3)*r^3 - 25*(13*b*e^3*n + 155*a*e^3)*r^2 + 375*(2*b
*e^3*n + 15*a*e^3)*r + (12*b*e^3*r^5 - 200*b*e^3*r^4 + 1275*b*e^3*r^3 - 38
75*b*e^3*r^2 + 5625*b*e^3*r - 3125*b*e^3)*log(c) + (12*b*e^3*n*r^5 - 200*b
*e^3*n*r^4 + 1275*b*e^3*n*r^3 - 3875*b*e^3*n*r^2 + 5625*b*e^3*n*r - 3125*b
*e^3*n)*log(x))*x^(3*r) - 75*(18*a*d*e^2*r^5 - 625*b*d*e^2*n - 3*(3*b*d*e^
2*n + 95*a*d*e^2)*r^4 - 3125*a*d*e^2 + 20*(6*b*d*e^2*n + 85*a*d*e^2)*r^3 -
 50*(11*b*d*e^2*n + 95*a*d*e^2)*r^2 + 250*(4*b*d*e^2*n + 25*a*d*e^2)*r + (
18*b*d*e^2*r^5 - 285*b*d*e^2*r^4 + 1700*b*d*e^2*r^3 - 4750*b*d*e^2*r^2 + 6
250*b*d*e^2*r - 3125*b*d*e^2)*log(c) + (18*b*d*e^2*n*r^5 - 285*b*d*e^2*n*r
^4 + 1700*b*d*e^2*n*r^3 - 4750*b*d*e^2*n*r^2 + 6250*b*d*e^2*n*r - 3125*b*d
*e^2*n)*log(x))*x^(2*r) - 75*(36*a*d^2*e*r^5 - 625*b*d^2*e*n - 12*(3*b*d^2
*e*n + 40*a*d^2*e)*r^4 - 3125*a*d^2*e + 25*(12*b*d^2*e*n + 97*a*d^2*e)*r^3
 - 25*(37*b*d^2*e*n + 235*a*d^2*e)*r^2 + 625*(2*b*d^2*e*n + 11*a*d^2*e)*r
+ (36*b*d^2*e*r^5 - 480*b*d^2*e*r^4 + 2425*b*d^2*e*r^3 - 5875*b*d^2*e*r^2
+ 6875*b*d^2*e*r - 3125*b*d^2*e)*log(c) + (36*b*d^2*e*n*r^5 - 480*b*d^2*e*
n*r^4 + 2425*b*d^2*e*n*r^3 - 5875*b*d^2*e*n*r^2 + 6875*b*d^2*e*n*r - 31...
```

3.403.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^6} dx = \text{Timed out}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**6,x)
```

output
```
Timed out
```

3.403.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^6}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^6,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-6>0)', see `assume?` for more
details)Is
```

3.403.8 Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^6}\,dx = \int \frac{(ex^r+d)^3(b\log(cx^n)+a)}{x^6}\,dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^6,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^6, x)
```

3.403.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^6}\,dx = \int \frac{(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))}{x^6}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^6,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^6, x)
```

3.404 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^8}\,dx$

3.404.1 Optimal result

Integrand size = 23, antiderivative size = 183

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^8}\,dx = -\frac{bd^3n}{49x^7}-\frac{3bd^2enx^{-7+r}}{(7-r)^2}-\frac{3bde^2nx^{-7+2r}}{(7-2r)^2}-\frac{be^3nx^{-7+3r}}{(7-3r)^2} -\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2ex^{-7+r}(a+b\log(cx^n))}{7-r} -\frac{3de^2x^{-7+2r}(a+b\log(cx^n))}{7-2r}-\frac{e^3x^{-7+3r}(a+b\log(cx^n))}{7-3r}$$

output
```
-1/49*b*d^3*n/x^7-3*b*d^2*e*n*x^(-7+r)/(7-r)^2-3*b*d*e^2*n*x^(-7+2*r)/(7-2
*r)^2-b*e^3*n*x^(-7+3*r)/(7-3*r)^2-1/7*d^3*(a+b*ln(c*x^n))/x^7-3*d^2*e*x^(
-7+r)*(a+b*ln(c*x^n))/(7-r)-3*d*e^2*x^(-7+2*r)*(a+b*ln(c*x^n))/(7-2*r)-e^3
*x^(-7+3*r)*(a+b*ln(c*x^n))/(7-3*r)
```

3.404.2 Mathematica [A] (verified)

Time = 0.26 (sec) , antiderivative size = 188, normalized size of antiderivative = 1.03

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^8}\,dx = \frac{bn\left(-d^3-\frac{147d^2ex^r}{(-7+r)^2}-\frac{147de^2x^{2r}}{(7-2r)^2}-\frac{49e^3x^{3r}}{(7-3r)^2}\right)+7a\left(-d^3+\frac{21d^2ex^r}{-7+r}+\frac{21de^2x^{2r}}{-7+2r}+\frac{7e^3x^{3r}}{-7+3r}\right)+7b\left(-d^3+\frac{21d^2ex^r}{-7+r}+\frac{21 \cdots}{\cdots}\right.}{49x^7}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*(-d^3 - (147*d^2*e*x^r)/(-7 + r)^2 - (147*d*e^2*x^(2*r))/(7 - 2*r)^2
- (49*e^3*x^(3*r))/(7 - 3*r)^2) + 7*a*(-d^3 + (21*d^2*e*x^r)/(-7 + r) + (2
1*d*e^2*x^(2*r))/(-7 + 2*r) + (7*e^3*x^(3*r))/(-7 + 3*r)) + 7*b*(-d^3 + (2
1*d^2*e*x^r)/(-7 + r) + (21*d*e^2*x^(2*r))/(-7 + 2*r) + (7*e^3*x^(3*r))/(-
7 + 3*r))*Log[c*x^n])/(49*x^7)
```

3.404.3 Rubi [A] (verified)

Time = 0.62 (sec) , antiderivative size = 182, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^8}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int -\frac{\frac{21d^2ex^r}{7-r}+\frac{21de^2x^{2r}}{7-2r}+\frac{7e^3x^{3r}}{7-3r}+d^3}{7x^8}dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2ex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{3de^2x^{2r-7}(a+b\log(cx^n))}{7-2r}-\frac{e^3x^{3r-7}(a+b\log(cx^n))}{7-3r}$$

$$\Big\downarrow \text{27}$$

$$\frac{1}{7}bn\int \frac{\frac{21d^2ex^r}{7-r}+\frac{21de^2x^{2r}}{7-2r}+\frac{7e^3x^{3r}}{7-3r}+d^3}{x^8}dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2ex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{3de^2x^{2r-7}(a+b\log(cx^n))}{7-2r}-\frac{e^3x^{3r-7}(a+b\log(cx^n))}{7-3r}$$

$$\Big\downarrow \text{2010}$$

$$\frac{1}{7}bn\int \left(-\frac{21d^2ex^{r-8}}{r-7}+\frac{21de^2x^{2(r-4)}}{7-2r}-\frac{7e^3x^{3r-8}}{3r-7}+\frac{d^3}{x^8}\right)dx-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2ex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{3de^2x^{2r-7}(a+b\log(cx^n))}{7-2r}-\frac{e^3x^{3r-7}(a+b\log(cx^n))}{7-3r}$$

$$\Big\downarrow \text{2009}$$

$$-\frac{d^3(a+b\log(cx^n))}{7x^7}-\frac{3d^2ex^{r-7}(a+b\log(cx^n))}{7-r}-\frac{3de^2x^{2r-7}(a+b\log(cx^n))}{7-2r}-\frac{e^3x^{3r-7}(a+b\log(cx^n))}{7-3r}+\frac{1}{7}bn\left(-\frac{d^3}{7x^7}-\frac{21d^2ex^{r-7}}{(7-r)^2}-\frac{21de^2x^{2r-7}}{(7-2r)^2}-\frac{7e^3x^{3r-7}}{(7-3r)^2}\right)$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^8,x]
```

output
```
(b*n*(-1/7*d^3/x^7 - (21*d^2*e*x^(-7 + r))/(7 - r)^2 - (21*d*e^2*x^(-7 + 2
*r))/(7 - 2*r)^2 - (7*e^3*x^(-7 + 3*r))/(7 - 3*r)^2))/7 - (d^3*(a + b*Log[
c*x^n]))/(7*x^7) - (3*d^2*e*x^(-7 + r)*(a + b*Log[c*x^n]))/(7 - r) - (3*d*
e^2*x^(-7 + 2*r)*(a + b*Log[c*x^n]))/(7 - 2*r) - (e^3*x^(-7 + 3*r)*(a + b*
Log[c*x^n]))/(7 - 3*r)
```

3.404.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.404.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1040 vs. $2(179) = 358$.

Time = 3.29 (sec) , antiderivative size = 1041, normalized size of antiderivative = 5.69

method	result	size
parallelrisch	Expression too large to display	1041
risch	Expression too large to display	4031

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^8,x,method=_RETURNVERBOSE)
```

output
```
-1/49*(823543*b*ln(c*x^n)*d^3+2470629*b*d*e^2*ln(c*x^n)*(x^r)^2+823543*e^3
*(x^r)^3*a-49392*b*d^3*n*r^3+139258*b*d^3*n*r^2-201684*b*d^3*n*r+1915998*a
*d*e^2*r^2*(x^r)^2-489804*a*d*e^2*r^3*(x^r)^2+2470629*d*e^2*(x^r)^2*a+2470
629*d^2*e*x^r*a+823543*a*d^3-122451*a*e^3*r^3*(x^r)^3+521017*a*e^3*r^2*(x^
r)^3-1058841*a*e^3*r*(x^r)^3-588*a*e^3*r^5*(x^r)^3+13720*a*e^3*r^4*(x^r)^3
-588*(x^r)^3*ln(c*x^n)*b*e^3*r^5+13720*(x^r)^3*ln(c*x^n)*b*e^3*r^4-122451*
(x^r)^3*ln(c*x^n)*b*e^3*r^3+521017*(x^r)^3*ln(c*x^n)*b*e^3*r^2-1058841*(x^
r)^3*ln(c*x^n)*b*e^3*r+2470629*b*d^2*e*ln(c*x^n)*x^r+36*b*d^3*n*r^6-924*b*
d^3*n*r^5+9457*b*d^3*n*r^4-5292*x^r*ln(c*x^n)*b*d^2*e*r^5+98784*x^r*ln(c*x
^n)*b*d^2*e*r^4-698691*x^r*ln(c*x^n)*b*d^2*e*r^3+2369787*x^r*ln(c*x^n)*b*d
^2*e*r^2-3882417*x^r*ln(c*x^n)*b*d^2*e*r-2646*(x^r)^2*ln(c*x^n)*b*d*e^2*r^
5+58653*(x^r)^2*ln(c*x^n)*b*d*e^2*r^4-489804*(x^r)^2*ln(c*x^n)*b*d*e^2*r^3
+1915998*(x^r)^2*ln(c*x^n)*b*d*e^2*r^2-3529470*(x^r)^2*ln(c*x^n)*b*d*e^2*r
+117649*b*d^3*n+252*ln(c*x^n)*b*d^3*r^6-6468*ln(c*x^n)*b*d^3*r^5+66199*ln(
c*x^n)*b*d^3*r^4-345744*ln(c*x^n)*b*d^3*r^3+974806*ln(c*x^n)*b*d^3*r^2-141
1788*ln(c*x^n)*b*d^3*r+823543*e^3*b*ln(c*x^n)*(x^r)^3-345744*a*d^3*r^3+974
806*a*d^3*r^2-1411788*a*d^3*r+252*a*d^3*r^6-6468*a*d^3*r^5+66199*a*d^3*r^4
-698691*a*d^2*e*r^3*x^r+352947*b*d*e^2*n*(x^r)^2+352947*b*d^2*e*n*x^r+1176
49*b*e^3*n*(x^r)^3-4116*b*e^3*n*r^3*(x^r)^3+31213*b*e^3*n*r^2*(x^r)^3-1008
42*b*e^3*n*r*(x^r)^3+2369787*a*d^2*e*r^2*x^r+98784*a*d^2*e*r^4*x^r-3882...
```

3.404.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 981 vs. $2(174) = 348$.

Time = 0.30 (sec) , antiderivative size = 981, normalized size of antiderivative = 5.36

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^8} \, dx = \text{Too large to display}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^8,x, algorithm="fricas")
```

output
```
-1/49*(36*(b*d^3*n + 7*a*d^3)*r^6 - 924*(b*d^3*n + 7*a*d^3)*r^5 + 117649*b
*d^3*n + 9457*(b*d^3*n + 7*a*d^3)*r^4 + 823543*a*d^3 - 49392*(b*d^3*n + 7*
a*d^3)*r^3 + 139258*(b*d^3*n + 7*a*d^3)*r^2 - 201684*(b*d^3*n + 7*a*d^3)*r
 - 49*(12*a*e^3*r^5 - 2401*b*e^3*n - 4*(b*e^3*n + 70*a*e^3)*r^4 - 16807*a*
e^3 + 21*(4*b*e^3*n + 119*a*e^3)*r^3 - 49*(13*b*e^3*n + 217*a*e^3)*r^2 + 1
029*(2*b*e^3*n + 21*a*e^3)*r + (12*b*e^3*r^5 - 280*b*e^3*r^4 + 2499*b*e^3*
r^3 - 10633*b*e^3*r^2 + 21609*b*e^3*r - 16807*b*e^3)*log(c) + (12*b*e^3*n*
r^5 - 280*b*e^3*n*r^4 + 2499*b*e^3*n*r^3 - 10633*b*e^3*n*r^2 + 21609*b*e^3
*n*r - 16807*b*e^3*n)*log(x))*x^(3*r) - 147*(18*a*d*e^2*r^5 - 2401*b*d*e^2
*n - 3*(3*b*d*e^2*n + 133*a*d*e^2)*r^4 - 16807*a*d*e^2 + 28*(6*b*d*e^2*n +
 119*a*d*e^2)*r^3 - 98*(11*b*d*e^2*n + 133*a*d*e^2)*r^2 + 686*(4*b*d*e^2*n
 + 35*a*d*e^2)*r + (18*b*d*e^2*r^5 - 399*b*d*e^2*r^4 + 3332*b*d*e^2*r^3 -
13034*b*d*e^2*r^2 + 24010*b*d*e^2*r - 16807*b*d*e^2)*log(c) + (18*b*d*e^2*
n*r^5 - 399*b*d*e^2*n*r^4 + 3332*b*d*e^2*n*r^3 - 13034*b*d*e^2*n*r^2 + 240
10*b*d*e^2*n*r - 16807*b*d*e^2*n)*log(x))*x^(2*r) - 147*(36*a*d^2*e*r^5 -
2401*b*d^2*e*n - 12*(3*b*d^2*e*n + 56*a*d^2*e)*r^4 - 16807*a*d^2*e + 7*(60
*b*d^2*e*n + 679*a*d^2*e)*r^3 - 49*(37*b*d^2*e*n + 329*a*d^2*e)*r^2 + 343*
(10*b*d^2*e*n + 77*a*d^2*e)*r + (36*b*d^2*e*r^5 - 672*b*d^2*e*r^4 + 4753*b
*d^2*e*r^3 - 16121*b*d^2*e*r^2 + 26411*b*d^2*e*r - 16807*b*d^2*e)*log(c) +
 (36*b*d^2*e*n*r^5 - 672*b*d^2*e*n*r^4 + 4753*b*d^2*e*n*r^3 - 16121*b*d...
```

3.404.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^8} \, dx = \text{Timed out}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**8,x)
```

output
```
Timed out
```

3.404.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^8} \, dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^8,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-8>0)', see `assume?` for more
details)Is
```

3.404.8 Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^8} \, dx = \int \frac{(ex^r+d)^3 (b\log(cx^n)+a)}{x^8} \, dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^8,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^8, x)
```

3.404.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^8} \, dx = \int \frac{(d+e\,x^r)^3 (a+b\,\ln(c\,x^n))}{x^8} \, dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^8,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^8, x)
```

3.405 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x^{10}}\,dx$

3.405.1 Optimal result

Integrand size = 23, antiderivative size = 191

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x^{10}}\,dx = -\frac{bd^3n}{81x^9}-\frac{be^3nx^{-3(3-r)}}{9(3-r)^2}-\frac{3bd^2enx^{-9+r}}{(9-r)^2}-\frac{3bde^2nx^{-9+2r}}{(9-2r)^2}-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{e^3x^{-3(3-r)}(a+b\log(cx^n))}{3(3-r)}-\frac{3d^2ex^{-9+r}(a+b\log(cx^n))}{9-r}-\frac{3de^2x^{-9+2r}(a+b\log(cx^n))}{9-2r}$$

output
```
-1/81*b*d^3*n/x^9-1/9*b*e^3*n/(3-r)^2/(x^(9-3*r))-3*b*d^2*e*n*x^(-9+r)/(9-
r)^2-3*b*d*e^2*n*x^(-9+2*r)/(9-2*r)^2-1/9*d^3*(a+b*ln(c*x^n))/x^9-1/3*e^3*
(a+b*ln(c*x^n))/(3-r)/(x^(9-3*r))-3*d^2*e*x^(-9+r)*(a+b*ln(c*x^n))/(9-r)-3
*d*e^2*x^(-9+2*r)*(a+b*ln(c*x^n))/(9-2*r)
```

3.405.2 Mathematica [A] (verified)

Time = 0.27 (sec) , antiderivative size = 182, normalized size of antiderivative = 0.95

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^{10}}\,dx$$
$$= \frac{bn\left(-d^3-\frac{243d^2ex^r}{(-9+r)^2}-\frac{243de^2x^{2r}}{(9-2r)^2}-\frac{9e^3x^{3r}}{(-3+r)^2}\right)+9a\left(-d^3+\frac{27d^2ex^r}{-9+r}+\frac{27de^2x^{2r}}{-9+2r}+\frac{3e^3x^{3r}}{-3+r}\right)+9b\left(-d^3+\frac{27d^2ex^r}{-9+r}+\cdots\right.}{81x^9}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^10,x]
```

output
```
(b*n*(-d^3 - (243*d^2*e*x^r)/(-9 + r)^2 - (243*d*e^2*x^(2*r))/(9 - 2*r)^2
- (9*e^3*x^(3*r))/(-3 + r)^2) + 9*a*(-d^3 + (27*d^2*e*x^r)/(-9 + r) + (27*
d*e^2*x^(2*r))/(-9 + 2*r) + (3*e^3*x^(3*r))/(-3 + r)) + 9*b*(-d^3 + (27*d^
2*e*x^r)/(-9 + r) + (27*d*e^2*x^(2*r))/(-9 + 2*r) + (3*e^3*x^(3*r))/(-3 +
r))*Log[c*x^n])/(81*x^9)
```

3.405.3 Rubi [A] (verified)

Time = 0.63 (sec) , antiderivative size = 188, normalized size of antiderivative = 0.98, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^{10}}\,dx$$
$$\Big\downarrow \; 2772$$
$$-bn\int -\frac{\frac{27d^2ex^r}{9-r}+\frac{27de^2x^{2r}}{9-2r}+\frac{3e^3x^{3r}}{3-r}+d^3}{9x^{10}}dx-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2ex^{r-9}(a+b\log(cx^n))}{9-r}-\frac{3de^2x^{2r-9}(a+b\log(cx^n))}{9-2r}-\frac{e^3x^{-3(3-r)}(a+b\log(cx^n))}{3(3-r)}$$
$$\Big\downarrow \; 27$$
$$\frac{1}{9}bn\int \frac{\frac{27d^2ex^r}{9-r}+\frac{27de^2x^{2r}}{9-2r}+\frac{3e^3x^{3r}}{3-r}+d^3}{x^{10}}dx-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2ex^{r-9}(a+b\log(cx^n))}{9-r}-\frac{3de^2x^{2r-9}(a+b\log(cx^n))}{9-2r}-\frac{e^3x^{-3(3-r)}(a+b\log(cx^n))}{3(3-r)}$$

$$\downarrow 2010$$

$$\frac{1}{9}bn\int\left(-\frac{27d^2ex^{r-10}}{r-9}+\frac{27de^2x^{2(r-5)}}{9-2r}-\frac{3e^3x^{3r-10}}{r-3}+\frac{d^3}{x^{10}}\right)dx-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2ex^{r-9}(a+b\log(cx^n))}{9-r}-\frac{3de^2x^{2r-9}(a+b\log(cx^n))}{9-2r}-\frac{e^3x^{-3(3-r)}(a+b\log(cx^n))}{3(3-r)}$$

$$\downarrow 2009$$

$$-\frac{d^3(a+b\log(cx^n))}{9x^9}-\frac{3d^2ex^{r-9}(a+b\log(cx^n))}{9-r}-\frac{3de^2x^{2r-9}(a+b\log(cx^n))}{9-2r}-\frac{e^3x^{-3(3-r)}(a+b\log(cx^n))}{3(3-r)}+\frac{1}{9}bn\left(-\frac{d^3}{9x^9}-\frac{27d^2ex^{r-9}}{(9-r)^2}-\frac{27de^2x^{2r-9}}{(9-2r)^2}-\frac{e^3x^{-3(3-r)}}{(3-r)^2}\right)$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x^10,x]
```

output
```
(b*n*(-1/9*d^3/x^9 - e^3/((3 - r)^2*x^(3*(3 - r))) - (27*d^2*e*x^(-9 + r))
/(9 - r)^2 - (27*d*e^2*x^(-9 + 2*r))/(9 - 2*r)^2))/9 - (d^3*(a + b*Log[c*x
^n]))/(9*x^9) - (e^3*(a + b*Log[c*x^n]))/(3*(3 - r)*x^(3*(3 - r))) - (3*d^
2*e*x^(-9 + r)*(a + b*Log[c*x^n]))/(9 - r) - (3*d*e^2*x^(-9 + 2*r)*(a + b*
Log[c*x^n]))/(9 - 2*r)
```

3.405.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.405.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1043 vs. $2(183) = 366$.

Time = 10.00 (sec) , antiderivative size = 1044, normalized size of antiderivative = 5.47

method	result	size
parallelrisch	Expression too large to display	1044
risch	Expression too large to display	4027

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x^10,x,method=_RETURNVERBOSE)
```

output
```
-1/81*(531441*b*ln(c*x^n)*d^3+1594323*b*d*e^2*ln(c*x^n)*(x^r)^2+531441*e^3
*(x^r)^3*a-11664*b*d^3*n*r^3+42282*b*d^3*n*r^2-78732*b*d^3*n*r+747954*a*d*
e^2*r^2*(x^r)^2-148716*a*d*e^2*r^3*(x^r)^2+1594323*d*e^2*(x^r)^2*a+1594323
*d^2*e*x^r*a+531441*a*d^3-37179*a*e^3*r^3*(x^r)^3+203391*a*e^3*r^2*(x^r)^3
-531441*a*e^3*r*(x^r)^3-108*a*e^3*r^5*(x^r)^3+3240*a*e^3*r^4*(x^r)^3-108*(
x^r)^3*ln(c*x^n)*b*e^3*r^5+3240*(x^r)^3*ln(c*x^n)*b*e^3*r^4-37179*(x^r)^3*
ln(c*x^n)*b*e^3*r^3+203391*(x^r)^3*ln(c*x^n)*b*e^3*r^2-531441*(x^r)^3*ln(c
*x^n)*b*e^3*r+1594323*b*d^2*e*ln(c*x^n)*x^r+4*b*d^3*n*r^6-132*b*d^3*n*r^5+
1737*b*d^3*n*r^4-972*x^r*ln(c*x^n)*b*d^2*e*r^5+23328*x^r*ln(c*x^n)*b*d^2*e
*r^4-212139*x^r*ln(c*x^n)*b*d^2*e*r^3+925101*x^r*ln(c*x^n)*b*d^2*e*r^2-194
8617*x^r*ln(c*x^n)*b*d^2*e*r-486*(x^r)^2*ln(c*x^n)*b*d*e^2*r^5+13851*(x^r)
^2*ln(c*x^n)*b*d*e^2*r^4-148716*(x^r)^2*ln(c*x^n)*b*d*e^2*r^3+747954*(x^r)
^2*ln(c*x^n)*b*d*e^2*r^2-1771470*(x^r)^2*ln(c*x^n)*b*d*e^2*r+59049*b*d^3*n
+36*ln(c*x^n)*b*d^3*r^6-1188*ln(c*x^n)*b*d^3*r^5+15633*ln(c*x^n)*b*d^3*r^4
-104976*ln(c*x^n)*b*d^3*r^3+380538*ln(c*x^n)*b*d^3*r^2-708588*ln(c*x^n)*b*
d^3*r+531441*e^3*b*ln(c*x^n)*(x^r)^3-104976*a*d^3*r^3+380538*a*d^3*r^2-708
588*a*d^3*r+36*a*d^3*r^6-1188*a*d^3*r^5+15633*a*d^3*r^4-212139*a*d^2*e*r^3
*x^r+177147*b*d*e^2*n*(x^r)^2+177147*b*d^2*e*n*x^r+59049*b*e^3*n*(x^r)^3-9
72*b*e^3*n*r^3*(x^r)^3+9477*b*e^3*n*r^2*(x^r)^3-39366*b*e^3*n*r*(x^r)^3+92
5101*a*d^2*e*r^2*x^r+23328*a*d^2*e*r^4*x^r-1948617*a*d^2*e*r*x^r+36*b*e...
```

3.405.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 981 vs. $2(175) = 350$.

Time = 0.29 (sec) , antiderivative size = 981, normalized size of antiderivative = 5.14

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^{10}}\,dx =$$
$$-\frac{4\,(bd^3n+9\,ad^3)r^6 - 132\,(bd^3n+9\,ad^3)r^5 + 59049\,bd^3n + 1737\,(bd^3n+9\,ad^3)r^4 + 531441\,ad^3 - 11664}{}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^10,x, algorithm="fricas")
```

output
```
-1/81*(4*(b*d^3*n + 9*a*d^3)*r^6 - 132*(b*d^3*n + 9*a*d^3)*r^5 + 59049*b*d
^3*n + 1737*(b*d^3*n + 9*a*d^3)*r^4 + 531441*a*d^3 - 11664*(b*d^3*n + 9*a*
d^3)*r^3 + 42282*(b*d^3*n + 9*a*d^3)*r^2 - 78732*(b*d^3*n + 9*a*d^3)*r - 9
*(12*a*e^3*r^5 - 6561*b*e^3*n - 4*(b*e^3*n + 90*a*e^3)*r^4 - 59049*a*e^3 +
 27*(4*b*e^3*n + 153*a*e^3)*r^3 - 81*(13*b*e^3*n + 279*a*e^3)*r^2 + 2187*(
2*b*e^3*n + 27*a*e^3)*r + 3*(4*b*e^3*r^5 - 120*b*e^3*r^4 + 1377*b*e^3*r^3
- 7533*b*e^3*r^2 + 19683*b*e^3*r - 19683*b*e^3)*log(c) + 3*(4*b*e^3*n*r^5
- 120*b*e^3*n*r^4 + 1377*b*e^3*n*r^3 - 7533*b*e^3*n*r^2 + 19683*b*e^3*n*r
- 19683*b*e^3*n)*log(x))*x^(3*r) - 243*(2*a*d*e^2*r^5 - 729*b*d*e^2*n - (b
*d*e^2*n + 57*a*d*e^2)*r^4 - 6561*a*d*e^2 + 12*(2*b*d*e^2*n + 51*a*d*e^2)*
r^3 - 18*(11*b*d*e^2*n + 171*a*d*e^2)*r^2 + 162*(4*b*d*e^2*n + 45*a*d*e^2)
*r + (2*b*d*e^2*r^5 - 57*b*d*e^2*r^4 + 612*b*d*e^2*r^3 - 3078*b*d*e^2*r^2
+ 7290*b*d*e^2*r - 6561*b*d*e^2)*log(c) + (2*b*d*e^2*n*r^5 - 57*b*d*e^2*n*
r^4 + 612*b*d*e^2*n*r^3 - 3078*b*d*e^2*n*r^2 + 7290*b*d*e^2*n*r - 6561*b*d
*e^2*n)*log(x))*x^(2*r) - 243*(4*a*d^2*e*r^5 - 729*b*d^2*e*n - 4*(b*d^2*e*
n + 24*a*d^2*e)*r^4 - 6561*a*d^2*e + 3*(20*b*d^2*e*n + 291*a*d^2*e)*r^3 -
9*(37*b*d^2*e*n + 423*a*d^2*e)*r^2 + 81*(10*b*d^2*e*n + 99*a*d^2*e)*r + (4
*b*d^2*e*r^5 - 96*b*d^2*e*r^4 + 873*b*d^2*e*r^3 - 3807*b*d^2*e*r^2 + 8019*
b*d^2*e*r - 6561*b*d^2*e)*log(c) + (4*b*d^2*e*n*r^5 - 96*b*d^2*e*n*r^4 + 8
73*b*d^2*e*n*r^3 - 3807*b*d^2*e*n*r^2 + 8019*b*d^2*e*n*r - 6561*b*d^2*e...
```

3.405.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^{10}}\,dx = \text{Timed out}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x**10,x)
```

output
```
Timed out
```

3.405.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^{10}}\,dx = \text{Exception raised: ValueError}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^10,x, algorithm="maxima")
```

output
```
Exception raised: ValueError >> Computation failed since Maxima requested
additional constraints; using the 'assume' command before evaluation *may*
 help (example of legal syntax is 'assume(r-10>0)', see `assume?` for more
 details)I
```

3.405.8 Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^{10}}\,dx = \int \frac{(ex^r+d)^3(b\log(cx^n)+a)}{x^{10}}\,dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x^10,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x^10, x)
```

3.405.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x^{10}}\,dx = \int \frac{(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))}{x^{10}}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^10,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x^10, x)
```

3.406 $\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx$

3.406.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx = \text{Int}\left(\frac{x^3(a+b\log(cx^n))}{d+ex^r},x\right)$$

output
```
Unintegrable(x^3*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

3.406.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 87 vs. 2(26) = 52.

Time = 0.09 (sec) , antiderivative size = 87, normalized size of antiderivative = 3.78

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx = \frac{x^4\left(-bn\,{}_3F_2\left(1,\frac{4}{r},\frac{4}{r};1+\frac{4}{r},1+\frac{4}{r};-\frac{ex^r}{d}\right)+4\,\text{Hypergeometric2F1}\left(1,\frac{4}{r},\frac{4+r}{r},-\frac{ex^r}{d}\right)(a+b\log(cx^n))\right)}{16d}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
(x^4*(-(b*n*HypergeometricPFQ[{1, 4/r, 4/r}, {1 + 4/r, 1 + 4/r}, -((e*x^r)
/d)]) + 4*Hypergeometric2F1[1, 4/r, (4 + r)/r, -((e*x^r)/d)]*(a + b*Log[c*
x^n])))/(16*d)
```

3.406.3 Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r} \, dx$$

$$\Big\downarrow \text{ 2796}$$

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}dx$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
$Aborted
```

3.406.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.406.4 Maple [N/A]

Not integrable

Time = 0.06 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{x^3(a+b\ln(c\,x^n))}{d+e\,x^r}dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

3.406.5 Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{ex^r+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e*x^r + d), x)
```

3.406.6 Sympy [N/A]

Not integrable

Time = 6.41 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx=\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(d+e*x**r),x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))/(d + e*x**r), x)
```

3.406.7 Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx=\int \frac{(b\log(cx^n)+a)x^3}{ex^r+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^r + d), x)
```

3.406.8 Giac [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{ex^r+d}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^r + d), x)
```

3.406.9 Mupad [N/A]

Not integrable

Time = 0.48 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^3(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{d+e\,x^r}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^r),x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^r), x)
```

3.407 $\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx$

3.407.1 Optimal result

Integrand size = 21, antiderivative size = 21

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \text{Int}\left(\frac{x(a+b\log(cx^n))}{d+ex^r},x\right)$$

output
```
Unintegrable(x*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

3.407.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 87 vs. 2(24) = 48.

Time = 0.08 (sec) , antiderivative size = 87, normalized size of antiderivative = 4.14

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \frac{x^2\left(-bn\,{}_3F_2\left(1,\frac{2}{r},\frac{2}{r};1+\frac{2}{r},1+\frac{2}{r};-\frac{ex^r}{d}\right)+2\,\text{Hypergeometric2F1}\left(1,\frac{2}{r},\frac{2+r}{r},-\frac{ex^r}{d}\right)(a+b\log(cx^n))\right)}{4d}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
(x^2*(-(b*n*HypergeometricPFQ[{1, 2/r, 2/r}, {1 + 2/r, 1 + 2/r}, -((e*x^r)
/d)]) + 2*Hypergeometric2F1[1, 2/r, (2 + r)/r, -((e*x^r)/d)]*(a + b*Log[c*
x^n])))/(4*d)
```

3.407.3 Rubi [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}dx$$
$$\Big\downarrow \ 2796$$
$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}dx$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
$Aborted
```

3.407.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.407.4 Maple [N/A]

Not integrable

Time = 0.05 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{x(a+b\ln(c\,x^n))}{d+e\,x^r}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

output
```
int(x*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

3.407.5 Fricas [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.19

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex^r+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x^n) + a*x)/(e*x^r + d), x)
```

3.407.6 Sympy [N/A]

Not integrable

Time = 2.49 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.90

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))/(d+e*x**r),x)
```

output
```
Integral(x*(a + b*log(c*x**n))/(d + e*x**r), x)
```

3.407.7 Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex^r+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^r + d), x)
```

3.407.8 Giac [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{(b\log(cx^n)+a)x}{ex^r+d}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^r + d), x)
```

3.407.9 Mupad [N/A]

Not integrable

Time = 0.43 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{d+e\,x^r}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^r),x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x^r), x)
```

3.408 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx$

3.408.1 Optimal result

Integrand size = 23, antiderivative size = 54

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx=-\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{dr}+\frac{bn\,\mathrm{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}$$

output
```
-(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d/r+b*n*polylog(2,-d/e/(x^r))/d/r^2
```

3.408.2 Mathematica [A] (warning: unable to verify)

Time = 0.11 (sec) , antiderivative size = 108, normalized size of antiderivative = 2.00

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = \frac{bnr^2\log^2(x)-2r(a+b\log(cx^n))\log(d-dx^r)+2bnr\log(x)(\log(d-dx^r)-\log(d+ex^r))+2bn\log(-}{2dr^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)),x]
```

output
```
(b*n*r^2*Log[x]^2 - 2*r*(a + b*Log[c*x^n])*Log[d - d*x^r] + 2*b*n*r*Log[x]
*(Log[d - d*x^r] - Log[d + e*x^r]) + 2*b*n*Log[-((e*x^r)/d)]*Log[d + e*x^r
] + 2*b*n*PolyLog[2, 1 + (e*x^r)/d])/(2*d*r^2)
```

3.408.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx$$

$$\Big\downarrow \text{2779}$$

$$\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}$$

$$\Big\downarrow \text{2838}$$

$$\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)),x]
```

output
```
-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*PolyLog[2, -(d/(e*
x^r))])/(d*r^2)
```

3.408.3.1 Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.408.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.64 (sec) , antiderivative size = 246, normalized size of antiderivative = 4.56

method	result
risch	$\frac{b\ln(d+e\,x^r)n\ln(x)}{rd} - \frac{b\ln(d+e\,x^r)\ln(x^n)}{rd} - \frac{b\ln(x^r)n\ln(x)}{rd} + \frac{b\ln(x^r)\ln(x^n)}{rd} + \frac{bn\ln(x)^2}{2d} - \frac{bn\ln(x)\ln\left(1+\frac{e\,x^r}{d}\right)}{rd} - \frac{bn\ \mathrm{Li}_2}{}$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r),x,method=_RETURNVERBOSE)
```

output
```
b/r/d*ln(d+e*x^r)*n*ln(x)-b/r/d*ln(d+e*x^r)*ln(x^n)-b/r/d*ln(x^r)*n*ln(x)+
b/r/d*ln(x^r)*ln(x^n)+1/2*b*n/d*ln(x)^2-b/r*n/d*ln(x)*ln(1+e*x^r/d)-b/r^2*
n/d*polylog(2,-e*x^r/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1
/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2
-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-1/r/d*ln(d+e*x^r)+1/r/d*ln(x^r))
```

3.408.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 93, normalized size of antiderivative = 1.72

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = \frac{bnr^2\log(x)^2 - 2\,bnr\log(x)\log\left(\frac{ex^r+d}{d}\right) - 2\,bn\mathrm{Li}_2\left(-\frac{ex^r+d}{d}+1\right) - 2\,(br\log(c)+ar)\log(ex^r+d) + 2\,(br^2}{2\,dr^2}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="fricas")
```

output
```
1/2*(b*n*r^2*log(x)^2 - 2*b*n*r*log(x)*log((e*x^r + d)/d) - 2*b*n*dilog(-(
e*x^r + d)/d + 1) - 2*(b*r*log(c) + a*r)*log(e*x^r + d) + 2*(b*r^2*log(c)
+ a*r^2)*log(x))/(d*r^2)
```

3.408.6 Sympy [A] (verification not implemented)

Time = 149.77 (sec) , antiderivative size = 452, normalized size of antiderivative = 8.37

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r),x)
```

output
```
-2*a*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (-log(-2*e*x**r)/(2*e), Tru
e))/(d*r) - 2*a*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (log(2*d + 2*e*x
**r)/(2*e), True))/(d*r) + 2*b*e*n*Piecewise((Piecewise((log(x)/(2*e) + x*
*r/(d*r), Ne(r, 0)), (log(x)/(2*e) + log(x)/d, True)), Eq(e, 0)), (-Piecew
ise((0, (Abs(e*x**r) < 1) & (1/Abs(e*x**r) < 1)), (log(e*x**r)**2/(2*r) +
I*pi*log(e*x**r)/r, Abs(e*x**r) < 1), (log(1/(e*x**r))**2/(2*r) - I*pi*log
(1/(e*x**r))/r, 1/Abs(e*x**r) < 1), (meijerg(((), (1, 1, 1)), ((0, 0, 0),
()), e*x**r*exp_polar(I*pi))/r + meijerg(((1, 1, 1), ()), ((), (0, 0, 0)),
 e*x**r*exp_polar(I*pi))/r, True))/(2*e) - log(2)*log(x)/(2*e), True))/(d*
r) + 2*b*e*n*Piecewise((Piecewise((log(x)/(2*e) + x**r/(d*r), Ne(r, 0)), (
log(x)/(2*e) + log(x)/d, True)), Eq(e, 0)), (Piecewise((-polylog(2, e*x**r
*exp_polar(I*pi)/d)/r, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - po
lylog(2, e*x**r*exp_polar(I*pi)/d)/r, Abs(x) < 1), (-log(d)*log(1/x) - pol
ylog(2, e*x**r*exp_polar(I*pi)/d)/r, 1/Abs(x) < 1), (-meijerg(((), (1, 1))
, ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d)
- polylog(2, e*x**r*exp_polar(I*pi)/d)/r, True))/(2*e) + log(2)*log(x)/(2*
e), True))/(d*r) - 2*b*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (-log(-2*
e*x**r)/(2*e), True))*log(c*x**n)/(d*r) - 2*b*e*Piecewise((1/(2*e) + x**r/
d, Eq(e, 0)), (log(2*d + 2*e*x**r)/(2*e), True))*log(c*x**n)/(d*r)
```

3.408.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="maxima")
```

output
```
a*(log(x)/d - log((e*x^r + d)/e)/(d*r)) + b*integrate((log(c) + log(x^n))/
(e*x*x^r + d*x), x)
```

3.408.8 Giac [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex^{r}+d\right)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)*x), x)
```

3.408.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)}\,dx=\int \frac{a+b\,\ln\left(c\,x^{n}\right)}{x\,\left(d+e\,x^{r}\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)), x)
```

3.409 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx$

3.409.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx = \text{Int}\left(\frac{a+b\log(cx^n)}{x^3(d+ex^r)},x\right)$$

output
```
Unintegrable((a+b*ln(c*x^n))/x^3/(d+e*x^r),x)
```

3.409.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 86 vs. 2(26) = 52.

Time = 0.09 (sec) , antiderivative size = 86, normalized size of antiderivative = 3.74

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx = -\frac{bn\,{}_3F_2\left(1,-\frac{2}{r},-\frac{2}{r};1-\frac{2}{r},1-\frac{2}{r};-\frac{ex^r}{d}\right)+2\,\text{Hypergeometric2F1}\left(1,-\frac{2}{r},\frac{-2+r}{r},-\frac{ex^r}{d}\right)(a+b\log(cx^n))}{4dx^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^r)),x]
```

output
```
-1/4*(b*n*HypergeometricPFQ[{1, -2/r, -2/r}, {1 - 2/r, 1 - 2/r}, -((e*x^r)
/d)] + 2*Hypergeometric2F1[1, -2/r, (-2 + r)/r, -((e*x^r)/d)]*(a + b*Log[c
*x^n]))/(d*x^2)
```

3.409.3 Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}dx$$

$$\Big\downarrow \text{2796}$$

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}dx$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^r)),x]
```

output
```
$Aborted
```

3.409.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.409.4 Maple [N/A]

Not integrable

Time = 0.05 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{a+b\ln(c\,x^n)}{x^3(d+e\,x^r)}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(d+e*x^r),x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(d+e*x^r),x)
```

3.409.5 Fricas [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^3*x^r + d*x^3), x)
```

3.409.6 Sympy [N/A]

Not integrable

Time = 5.71 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx = \int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(d+e*x**r),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**3*(d + e*x**r)), x)
```

3.409.7 Maxima [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)*x^3), x)
```

3.409.8 Giac [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^r\right)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{(ex^r+d)x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)*x^3), x)
```

3.409.9 Mupad [N/A]

Not integrable

Time = 0.43 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log\left(cx^n\right)}{x^3\left(d+ex^r\right)}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x^3\,\left(d+e\,x^r\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^r)),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^r)), x)
```

3.410 $\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx$

3.410.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx = \text{Int}\left(\frac{x^2(a+b\log(cx^n))}{d+ex^r},x\right)$$

output
```
Unintegrable(x^2*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

3.410.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 87 vs. 2(26) = 52.

Time = 0.08 (sec) , antiderivative size = 87, normalized size of antiderivative = 3.78

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx = \frac{x^3\left(-bn\,{}_3F_2\left(1,\frac{3}{r},\frac{3}{r};1+\frac{3}{r},1+\frac{3}{r};-\frac{ex^r}{d}\right)+3\,\text{Hypergeometric2F1}\left(1,\frac{3}{r},\frac{3+r}{r},-\frac{ex^r}{d}\right)(a+b\log(cx^n))\right)}{9d}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
(x^3*(-(b*n*HypergeometricPFQ[{1, 3/r, 3/r}, {1 + 3/r, 1 + 3/r}, -((e*x^r)
/d)]) + 3*Hypergeometric2F1[1, 3/r, (3 + r)/r, -((e*x^r)/d)]*(a + b*Log[c*
x^n])))/(9*d)
```

3.410.3 Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx$$

$$\Big\downarrow \ 2796$$

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}dx$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
$Aborted
```

3.410.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.410.4 Maple [N/A]

Not integrable

Time = 0.06 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{x^2(a+b\ln(c\,x^n))}{d+e\,x^r}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

3.410.5 Fricas [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx=\int \frac{(b\log(cx^n)+a)x^2}{ex^r+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e*x^r + d), x)
```

3.410.6 Sympy [N/A]

Not integrable

Time = 4.02 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx=\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(d+e*x**r),x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**r), x)
```

3.410.7 Maxima [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx=\int \frac{(b\log(cx^n)+a)x^2}{ex^r+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^r + d), x)
```

3.410.8 Giac [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{ex^r+d}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^r + d), x)
```

3.410.9 Mupad [N/A]

Not integrable

Time = 0.48 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2(a+b\log(cx^n))}{d+ex^r}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{d+e\,x^r}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^r),x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^r), x)
```

3.411 $\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx$

3.411.1 Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx = \text{Int}\left(\frac{a+b\log(cx^n)}{d+ex^r},x\right)$$

output
```
Unintegrable((a+b*ln(c*x^n))/(d+e*x^r),x)
```

3.411.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 69 vs. 2(23) = 46.

Time = 0.07 (sec) , antiderivative size = 69, normalized size of antiderivative = 3.45

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx = \frac{x\left(-bn\,{}_3F_2\left(1,\frac{1}{r},\frac{1}{r};1+\frac{1}{r},1+\frac{1}{r};-\frac{ex^r}{d}\right)+\text{Hypergeometric2F1}\left(1,\frac{1}{r},1+\frac{1}{r},-\frac{ex^r}{d}\right)(a+b\log(cx^n))\right)}{d}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^r),x]
```

output
```
(x*(-(b*n*HypergeometricPFQ[{1, r^(-1), r^(-1)}, {1 + r^(-1), 1 + r^(-1)},
 -((e*x^r)/d)]) + Hypergeometric2F1[1, r^(-1), 1 + r^(-1), -((e*x^r)/d)]*(
a + b*Log[c*x^n])))/d
```

3.411.3 Rubi [N/A]

Not integrable

Time = 0.17 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx$$

$$\Big\downarrow \; 2768$$

$$\int \frac{a+b\log(cx^n)}{d+ex^r}dx$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^r),x]
```

output
```
$Aborted
```

3.411.3.1 Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

3.411.4 Maple [N/A]

Not integrable

Time = 0.05 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{a+b\ln(c\,x^n)}{d+e\,x^r}dx$$

input
```
int((a+b*ln(c*x^n))/(d+e*x^r),x)
```

output
```
int((a+b*ln(c*x^n))/(d+e*x^r),x)
```

3.411.5 Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx=\int \frac{b\log(cx^n)+a}{ex^r+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^r + d), x)
```

3.411.6 Sympy [N/A]

Not integrable

Time = 1.59 (sec) , antiderivative size = 17, normalized size of antiderivative = 0.85

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx=\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(d+e*x**r),x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**r), x)
```

3.411.7 Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx=\int \frac{b\log(cx^n)+a}{ex^r+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^r + d), x)
```

3.411.8 Giac [N/A]

Not integrable

Time = 0.33 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx=\int \frac{b\log(cx^n)+a}{ex^r+d}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^r + d), x)
```

3.411.9 Mupad [N/A]

Not integrable

Time = 0.65 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log(cx^n)}{d+ex^r}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{d+e\,x^r}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^r),x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^r), x)
```

3.412 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx$

3.412.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx = \text{Int}\left(\frac{a+b\log(cx^n)}{x^2(d+ex^r)},x\right)$$

output
```
Unintegrable((a+b*ln(c*x^n))/x^2/(d+e*x^r),x)
```

3.412.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 83 vs. 2(26) = 52.

Time = 0.09 (sec) , antiderivative size = 83, normalized size of antiderivative = 3.61

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx = -\frac{bn\,{}_3F_2\left(1,-\frac{1}{r},-\frac{1}{r};1-\frac{1}{r},1-\frac{1}{r};-\frac{ex^r}{d}\right)+\text{Hypergeometric2F1}\left(1,-\frac{1}{r},\frac{-1+r}{r},-\frac{ex^r}{d}\right)(a+b\log(cx^n))}{dx}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^r)),x]
```

output
```
-((b*n*HypergeometricPFQ[{1, -r^(-1), -r^(-1)}, {1 - r^(-1), 1 - r^(-1)},
-((e*x^r)/d)] + Hypergeometric2F1[1, -r^(-1), (-1 + r)/r, -((e*x^r)/d)]*(a
 + b*Log[c*x^n]))/(d*x))
```

3.412.3 Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}\,dx$$
$$\Big\downarrow \; 2796$$
$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)}dx$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^r)),x]
```

output
```
$Aborted
```

3.412.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.412.4 Maple [N/A]

Not integrable

Time = 0.06 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{a+b\ln(c\,x^n)}{x^2(d+e\,x^r)}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(d+e*x^r),x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(d+e*x^r),x)
```

3.412.5 Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.26

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex^r)}\,dx = \int \frac{b\log(cx^n) + a}{(ex^r + d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e*x^2*x^r + d*x^2), x)
```

3.412.6 Sympy [N/A]

Not integrable

Time = 3.81 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.87

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex^r)}\,dx = \int \frac{a + b\log(cx^n)}{x^2(d + ex^r)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(d+e*x**r),x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*(d + e*x**r)), x)
```

3.412.7 Maxima [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex^r)}\,dx = \int \frac{b\log(cx^n) + a}{(ex^r + d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)*x^2), x)
```

3.412.8 Giac [N/A]

Not integrable

Time = 0.41 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex^r)}\,dx = \int \frac{b\log(cx^n) + a}{(ex^r + d)x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)*x^2), x)
```

3.412.9 Mupad [N/A]

Not integrable

Time = 0.43 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a + b\log(cx^n)}{x^2(d + ex^r)}\,dx = \int \frac{a + b\,\ln(c\,x^n)}{x^2\,(d + e\,x^r)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^r)),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^r)), x)
```

3.413 $\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$

3.413.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \text{Int}\left(\frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2},x\right)$$

output
```
Unintegrable(x^3*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

3.413.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 140 vs. 2(26) = 52.

Time = 0.16 (sec) , antiderivative size = 140, normalized size of antiderivative = 6.09

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$
$$= \frac{x^4\left(-bn(-4+r)\left(d+ex^r\right)\,{}_3F_2\left(1,\frac{4}{r},\frac{4}{r};1+\frac{4}{r},1+\frac{4}{r};-\frac{ex^r}{d}\right)+16d(a+b\log(cx^n))+4(d+ex^r)\,\text{Hypergeom}\right.}{16d^2r\,(d+ex^r)}$$

input
```
Integrate[(x^3*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
(x^4*(-(b*n*(-4 + r)*(d + e*x^r)*HypergeometricPFQ[{1, 4/r, 4/r}, {1 + 4/r
, 1 + 4/r}, -((e*x^r)/d)]) + 16*d*(a + b*Log[c*x^n]) + 4*(d + e*x^r)*Hyper
geometric2F1[1, 4/r, (4 + r)/r, -((e*x^r)/d)]*(-(b*n) + a*(-4 + r) + b*(-4
 + r)*Log[c*x^n])))/(16*d^2*r*(d + e*x^r))
```

3.413.3 Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2} dx$$

$$\Big\downarrow \; 2796$$

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2} dx$$

input
```
Int[(x^3*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
$Aborted
```

3.413.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.413.4 Maple [N/A]

Not integrable

Time = 0.06 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{x^3(a+b\ln(c\,x^n))}{(d+e\,x^r)^2} dx$$

input
```
int(x^3*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int(x^3*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

3.413.5 Fricas [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.83

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^r+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((b*x^3*log(c*x^n) + a*x^3)/(e^2*x^(2*r) + 2*d*e*x^r + d^2), x)
```

3.413.6 Sympy [N/A]

Not integrable

Time = 56.21 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$

input
```
integrate(x**3*(a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

output
```
Integral(x**3*(a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

3.413.7 Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^r+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^r + d)^2, x)
```

3.413.8 Giac [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^3}{(ex^r+d)^2}\,dx$$

input
```
integrate(x^3*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^3/(e*x^r + d)^2, x)
```

3.413.9 Mupad [N/A]

Not integrable

Time = 0.57 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^3(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{x^3\,(a+b\,\ln(c\,x^n))}{(d+e\,x^r)^2}\,dx$$

input
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^r)^2,x)
```

output
```
int((x^3*(a + b*log(c*x^n)))/(d + e*x^r)^2, x)
```

3.414 $\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$

3.414.1 Optimal result

Integrand size = 21, antiderivative size = 21

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \operatorname{Int}\left(\frac{x(a+b\log(cx^n))}{(d+ex^r)^2},x\right)$$

output
```
Unintegrable(x*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

3.414.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 140 vs. 2(24) = 48.

Time = 0.16 (sec) , antiderivative size = 140, normalized size of antiderivative = 6.67

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \frac{x^2\left(-bn(-2+r)(d+ex^r)\,{}_3F_2\left(1,\frac{2}{r},\frac{2}{r};1+\frac{2}{r},1+\frac{2}{r};-\frac{ex^r}{d}\right)+4d(a+b\log(cx^n))+2(d+ex^r)\,\text{Hypergeome}\right.}{4d^2r(d+ex^r)}$$

input
```
Integrate[(x*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
(x^2*(-(b*n*(-2 + r)*(d + e*x^r)*HypergeometricPFQ[{1, 2/r, 2/r}, {1 + 2/r
, 1 + 2/r}, -((e*x^r)/d)]) + 4*d*(a + b*Log[c*x^n]) + 2*(d + e*x^r)*Hyperg
eometric2F1[1, 2/r, (2 + r)/r, -((e*x^r)/d)]*(-(b*n) + a*(-2 + r) + b*(-2
+ r)*Log[c*x^n])))/(4*d^2*r*(d + e*x^r))
```

3.414.3 Rubi [N/A]

Not integrable

Time = 0.19 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$

$$\Big\downarrow \text{ 2796}$$

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}dx$$

input
```
Int[(x*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
$Aborted
```

3.414.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.414.4 Maple [N/A]

Not integrable

Time = 0.06 (sec) , antiderivative size = 21, normalized size of antiderivative = 1.00

$$\int \frac{x(a+b\ln(c\,x^n))}{(d+e\,x^r)^2}dx$$

input
```
int(x*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int(x*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

3.414.5 Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 38, normalized size of antiderivative = 1.81

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx=\int \frac{(b\log(cx^n)+a)x}{(ex^r+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((b*x*log(c*x^n) + a*x)/(e^2*x^(2*r) + 2*d*e*x^r + d^2), x)
```

3.414.6 Sympy [N/A]

Not integrable

Time = 10.05 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.95

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx=\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$

input
```
integrate(x*(a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

output
```
Integral(x*(a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

3.414.7 Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx=\int \frac{(b\log(cx^n)+a)x}{(ex^r+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^r + d)^2, x)
```

3.414.8 Giac [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x}{(ex^r+d)^2}\,dx$$

input
```
integrate(x*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x/(e*x^r + d)^2, x)
```

3.414.9 Mupad [N/A]

Not integrable

Time = 0.55 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.10

$$\int \frac{x(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{x\,(a+b\,\ln(c\,x^n))}{(d+e\,x^r)^2}\,dx$$

input
```
int((x*(a + b*log(c*x^n)))/(d + e*x^r)^2,x)
```

output
```
int((x*(a + b*log(c*x^n)))/(d + e*x^r)^2, x)
```

3.415 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx$

3.415.1 Optimal result

Integrand size = 23, antiderivative size = 102

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx = -\frac{ex^r(a+b\log(cx^n))}{d^2r(d+ex^r)} - \frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r} + \frac{bn\log(d+ex^r)}{d^2r^2} + \frac{bn\,\mathrm{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^2r^2}$$

output
```
-e*x^r*(a+b*ln(c*x^n))/d^2/r/(d+e*x^r)-(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d^2
/r+b*n*ln(d+e*x^r)/d^2/r^2+b*n*polylog(2,-d/e/(x^r))/d^2/r^2
```

3.415.2 Mathematica [A] (warning: unable to verify)

Time = 0.21 (sec) , antiderivative size = 132, normalized size of antiderivative = 1.29

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx = \frac{\frac{dr(a+b\log(cx^n))}{d+ex^r} + bn\log(d-dx^r) - ar\log(d-dx^r) + br(n\log(x)-\log(cx^n))\log(d-dx^r) + bn\left(\frac{1}{2}r^2\log^2(\right.}{d^2r^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^2),x]
```

output
```
((d*r*(a + b*Log[c*x^n]))/(d + e*x^r) + b*n*Log[d - d*x^r] - a*r*Log[d - d
*x^r] + b*r*(n*Log[x] - Log[c*x^n])*Log[d - d*x^r] + b*n*((r^2*Log[x]^2)/2
 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^
r)/d]))/(d^2*r^2)
```

3.415.3 Rubi [A] (verified)

Time = 0.55 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.14, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.217, Rules used = {2791, 2773, 792, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}dx$$

$$\Big\downarrow \text{2791}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\int \frac{x^{r-1}(a+b\log(cx^n))}{(ex^r+d)^2}dx}{d}$$

$$\Big\downarrow \text{2773}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\int \frac{x^{r-1}}{ex^r+d}dx}{dr}\right)}{d}$$

$$\Big\downarrow \text{792}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^2),x]
```

output
```
-((e*((x^r*(a + b*Log[c*x^n]))/(d*r*(d + e*x^r)) - (b*n*Log[d + e*x^r])/(d
*e*r^2)))/d) + (-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*Po
lyLog[2, -(d/(e*x^r))])/(d*r^2))/d
```

3.415.3.1 Defintions of rubi rules used

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.415. $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx$

3.415.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.20 (sec) , antiderivative size = 342, normalized size of antiderivative = 3.35

method	result
risch	$\frac{b\ln(d+e\,x^{r})n\ln(x)}{r\,d^{2}}-\frac{b\ln(d+e\,x^{r})\ln(x^{n})}{r\,d^{2}}-\frac{bn\ln(x)}{rd(d+e\,x^{r})}+\frac{b\ln(x^{n})}{rd(d+e\,x^{r})}-\frac{b\ln(x^{r})n\ln(x)}{r\,d^{2}}+\frac{b\ln(x^{r})\ln(x^{n})}{r\,d^{2}}+\frac{bn\ln(d+e\,x^{r})}{d^{2}r^{2}}$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^2,x,method=_RETURNVERBOSE)
```

output
```
b/r/d^2*ln(d+e*x^r)*n*ln(x)-b/r/d^2*ln(d+e*x^r)*ln(x^n)-b/r/d/(d+e*x^r)*n*
ln(x)+b/r/d/(d+e*x^r)*ln(x^n)-b/r/d^2*ln(x^r)*n*ln(x)+b/r/d^2*ln(x^r)*ln(x
^n)+b*n*ln(d+e*x^r)/d^2/r^2-b/r*n*e/d^2*ln(x)*x^r/(d+e*x^r)-b/r^2*n/d^2*di
log((d+e*x^r)/d)-b/r*n/d^2*ln(x)*ln((d+e*x^r)/d)+1/2*b*n/d^2*ln(x)^2+(-1/2
*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*
x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b
*ln(c)+a)/r*(-1/d^2*ln(d+e*x^r)+1/d/(d+e*x^r)+1/d^2*ln(x^r))
```

3.415.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 214 vs. $2(101) = 202$.

Time = 0.28 (sec) , antiderivative size = 214, normalized size of antiderivative = 2.10

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)^{2}}\,dx$$
$$=\frac{bdnr^{2}\log\left(x\right)^{2}+2\,bdr\log\left(c\right)+2\,adr+\left(benr^{2}\log\left(x\right)^{2}+2\left(ber^{2}\log\left(c\right)-benr+aer^{2}\right)\log\left(x\right)\right)x^{r}-2\,(ben$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
1/2*(b*d*n*r^2*log(x)^2 + 2*b*d*r*log(c) + 2*a*d*r + (b*e*n*r^2*log(x)^2 +
 2*(b*e*r^2*log(c) - b*e*n*r + a*e*r^2)*log(x))*x^r - 2*(b*e*n*x^r + b*d*n
)*dilog(-(e*x^r + d)/d + 1) - 2*(b*d*r*log(c) - b*d*n + a*d*r + (b*e*r*log
(c) - b*e*n + a*e*r)*x^r)*log(e*x^r + d) + 2*(b*d*r^2*log(c) + a*d*r^2)*lo
g(x) - 2*(b*e*n*r*x^r*log(x) + b*d*n*r*log(x))*log((e*x^r + d)/d))/(d^2*e*
r^2*x^r + d^3*r^2)
```

3.415.6 Sympy [A] (verification not implemented)

Time = 144.22 (sec) , antiderivative size = 360, normalized size of antiderivative = 3.53

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx = -\frac{ae\left(\begin{cases}\frac{x^r}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x^r} & \text{otherwise}\end{cases}\right)}{dr} - \frac{ae\left(\begin{cases}\frac{x^r}{d} & \text{for } e=0\\ \frac{\log(d+ex^r)}{e} & \text{otherwise}\end{cases}\right)}{d^2r}$$

$$+\frac{a\log(x^r)}{d^2r} + \frac{ben\left(\begin{cases}\frac{\begin{cases}\frac{x^r}{r} & \text{for } r\neq 0\\ \log(x) & \text{otherwise}\end{cases}}{d^2} & \text{for } e=0\\ -\begin{cases}\frac{\log(x)}{e^2} & \text{for } d=0\wedge r=0\\ -\frac{x^{-r}}{e^2r} & \text{for } d=0\\ \frac{\log(x)}{de+e^2} & \text{for } r=0\\ \frac{\log(x)}{de}-\frac{\log\left(\frac{d}{e}+x^r\right)}{der} & \text{otherwise}\end{cases} & \text{otherwise}\end{cases}\right)}{dr}$$

$$-\frac{be\left(\begin{cases}\frac{x^r}{d^2} & \text{for } e=0\\ -\frac{1}{de+e^2x^r} & \text{otherwise}\end{cases}\right)\log(cx^n)}{dr}$$

$$+\frac{ben\left(\begin{cases}\frac{\begin{cases}\frac{x^r}{r} & \text{for } r\neq 0\\ \log(x) & \text{otherwise}\end{cases}}{d} & \text{for } e=0\\ \frac{\begin{cases}-\frac{\mathrm{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{for } \frac{1}{|x|}<1\wedge|x|<1\\ \log(d)\log(x)-\frac{\mathrm{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{for } |x|<1\\ -\log(d)\log\left(\frac{1}{x}\right)-\frac{\mathrm{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{for } \frac{1}{|x|}<1\\ -G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\ 0,0 & \end{matrix}\middle| x\right)\log(d)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log(d)-\frac{\mathrm{Li}_2\left(\frac{ex^re^{i\pi}}{d}\right)}{r} & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{d^2r}$$

$$-\frac{be\left(\begin{cases}\frac{x^r}{d} & \text{for } e=0\\ \frac{\log(d+ex^r)}{e} & \text{otherwise}\end{cases}\right)\log(cx^n)}{d^2r}$$

$$+\frac{bn\left(\begin{cases}0 & \text{for } r=0\\ -\frac{\log(x^r)^2}{2r} & \text{otherwise}\end{cases}\right)}{d^2r}+\frac{b\log(x^r)\log(cx^n)}{d^2r}$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**2,x)
```

output
```
-a*e*Piecewise((x**r/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**r), True))/(d*r)
- a*e*Piecewise((x**r/d, Eq(e, 0)), (log(d + e*x**r)/e, True))/(d**2*r) +
a*log(x**r)/(d**2*r) + b*e*n*Piecewise((Piecewise((x**r/r, Ne(r, 0)), (log
(x), True))/d**2, Eq(e, 0)), (-Piecewise((log(x)/e**2, Eq(d, 0) & Eq(r, 0)
), (-1/(e**2*r*x**r), Eq(d, 0)), (log(x)/(d*e + e**2), Eq(r, 0)), (log(x)/
(d*e) - log(d/e + x**r)/(d*e*r), True)), True))/(d*r) - b*e*Piecewise((x**
r/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**r), True))*log(c*x**n)/(d*r) + b*e*n
*Piecewise((Piecewise((x**r/r, Ne(r, 0)), (log(x), True))/d, Eq(e, 0)), (P
iecewise((-polylog(2, e*x**r*exp_polar(I*pi)/d)/r, (Abs(x) < 1) & (1/Abs(x
) < 1)), (log(d)*log(x) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, Abs(x) <
 1), (-log(d)*log(1/x) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, 1/Abs(x)
< 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), (
)), ((), (0, 0)), x)*log(d) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, True
))/e, True))/(d**2*r) - b*e*Piecewise((x**r/d, Eq(e, 0)), (log(d + e*x**r)
/e, True))*log(c*x**n)/(d**2*r) + b*n*Piecewise((0, Eq(r, 0)), (-log(x**r)
**2/(2*r), True))/(d**2*r) + b*log(x**r)*log(c*x**n)/(d**2*r)
```

3.415.7 Maxima [F]

$$\int \frac{a + b\log(cx^n)}{x(d + ex^r)^2}\,dx = \int \frac{b\log(cx^n) + a}{(ex^r + d)^2 x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
a*(1/(d*e*r*x^r + d^2*r) + log(x)/d^2 - log((e*x^r + d)/e)/(d^2*r)) + b*in
tegrate((log(c) + log(x^n))/(e^2*x*x^(2*r) + 2*d*e*x*x^r + d^2*x), x)
```

3.415.8 Giac [F]

$$\int \frac{a + b\log(cx^n)}{x(d + ex^r)^2}\,dx = \int \frac{b\log(cx^n) + a}{(ex^r + d)^2 x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x), x)
```

3.415.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x^r)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^2), x)
```

3.416 $\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx$

3.416.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx = \text{Int}\left(\frac{a+b\log(cx^n)}{x^3(d+ex^r)^2},x\right)$$

output
```
Unintegrable((a+b*ln(c*x^n))/x^3/(d+e*x^r)^2,x)
```

3.416.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 139 vs. 2(26) = 52.

Time = 0.16 (sec) , antiderivative size = 139, normalized size of antiderivative = 6.04

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx = -\frac{bn(2+r)(d+ex^r)\,{}_3F_2\left(1,-\frac{2}{r},-\frac{2}{r};1-\frac{2}{r},1-\frac{2}{r};-\frac{ex^r}{d}\right)-4d(a+b\log(cx^n))+2(d+ex^r)\,\text{Hypergeome}}{4d^2rx^2(d+ex^r)}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^3*(d + e*x^r)^2),x]
```

output
```
-1/4*(b*n*(2 + r)*(d + e*x^r)*HypergeometricPFQ[{1, -2/r, -2/r}, {1 - 2/r,
 1 - 2/r}, -((e*x^r)/d)] - 4*d*(a + b*Log[c*x^n]) + 2*(d + e*x^r)*Hypergeo
metric2F1[1, -2/r, (-2 + r)/r, -((e*x^r)/d)]*(-(b*n) + a*(2 + r) + b*(2 +
r)*Log[c*x^n]))/(d^2*r*x^2*(d + e*x^r))
```

3.416.3 Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx$$

$$\Big\downarrow \text{2796}$$

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}dx$$

input
```
Int[(a + b*Log[c*x^n])/(x^3*(d + e*x^r)^2),x]
```

output
```
$Aborted
```

3.416.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.416.4 Maple [N/A]

Not integrable

Time = 0.06 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{a+b\ln(c\,x^n)}{x^3(d+e\,x^r)^2}dx$$

input
```
int((a+b*ln(c*x^n))/x^3/(d+e*x^r)^2,x)
```

output
```
int((a+b*ln(c*x^n))/x^3/(d+e*x^r)^2,x)
```

3.416.5 Fricas [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.96

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^3*x^(2*r) + 2*d*e*x^3*x^r + d^2*x^3), x
)
```

3.416.6 Sympy [N/A]

Not integrable

Time = 117.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx = \int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**3/(d+e*x**r)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(x**3*(d + e*x**r)**2), x)
```

3.416.7 Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x^3), x)
```

3.416.8 Giac [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^2x^3}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^3/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x^3), x)
```

3.416.9 Mupad [N/A]

Not integrable

Time = 0.46 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{x^3(d+ex^r)^2}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^3\,(d+e\,x^r)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^r)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^3*(d + e*x^r)^2), x)
```

3.417 $\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$

3.417.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \text{Int}\left(\frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2},x\right)$$

output
```
Unintegrable(x^2*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

3.417.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 140 vs. 2(26) = 52.

Time = 0.16 (sec) , antiderivative size = 140, normalized size of antiderivative = 6.09

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \frac{x^3\left(-bn(-3+r)(d+ex^r)\,{}_3F_2\left(1,\frac{3}{r},\frac{3}{r};1+\frac{3}{r},1+\frac{3}{r};-\frac{ex^r}{d}\right)+9d(a+b\log(cx^n))+3(d+ex^r)\,\text{Hypergeome}\right.}{9d^2r\,(d+ex^r)}$$

input
```
Integrate[(x^2*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
(x^3*(-(b*n*(-3 + r)*(d + e*x^r)*HypergeometricPFQ[{1, 3/r, 3/r}, {1 + 3/r
, 1 + 3/r}, -((e*x^r)/d)]) + 9*d*(a + b*Log[c*x^n]) + 3*(d + e*x^r)*Hyperg
eometric2F1[1, 3/r, (3 + r)/r, -((e*x^r)/d)]*(-(b*n) + a*(-3 + r) + b*(-3
+ r)*Log[c*x^n])))/(9*d^2*r*(d + e*x^r))
```

3.417.3 Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}dx$$

$$\Big\downarrow \text{2796}$$

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}dx$$

input
```
Int[(x^2*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
$Aborted
```

3.417.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.417.4 Maple [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{x^2(a+b\ln(c\,x^n))}{(d+e\,x^r)^2}dx$$

input
```
int(x^2*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int(x^2*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

3.417.5 Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.83

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^r+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((b*x^2*log(c*x^n) + a*x^2)/(e^2*x^(2*r) + 2*d*e*x^r + d^2), x)
```

3.417.6 Sympy [N/A]

Not integrable

Time = 23.10 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$

input
```
integrate(x**2*(a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

output
```
Integral(x**2*(a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

3.417.7 Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^r+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^r + d)^2, x)
```

3.417.8 Giac [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)x^2}{(ex^r+d)^2}\,dx$$

input
```
integrate(x^2*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*x^2/(e*x^r + d)^2, x)
```

3.417.9 Mupad [N/A]

Not integrable

Time = 0.53 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{x^2(a+b\log(cx^n))}{(d+ex^r)^2}\,dx = \int \frac{x^2\,(a+b\,\ln(c\,x^n))}{(d+e\,x^r)^2}\,dx$$

input
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^r)^2,x)
```

output
```
int((x^2*(a + b*log(c*x^n)))/(d + e*x^r)^2, x)
```

3.418 $\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx$

3.418.1 Optimal result

Integrand size = 20, antiderivative size = 20

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx = \text{Int}\left(\frac{a+b\log(cx^n)}{(d+ex^r)^2},x\right)$$

output
```
Unintegrable((a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

3.418.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 161 vs. 2(23) = 46.

Time = 1.71 (sec) , antiderivative size = 161, normalized size of antiderivative = 8.05

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}\,dx = \frac{x\left(adr\,\text{Hypergeometric2F1}\left(2,\frac{1}{r},1+\frac{1}{r},-\frac{ex^r}{d}\right)+aerx^r\,\text{Hypergeometric2F1}\left(2,\frac{1}{r},1+\frac{1}{r},-\frac{ex^r}{d}\right)-bn(-1+\right.}{}$$

input
```
Integrate[(a + b*Log[c*x^n])/(d + e*x^r)^2,x]
```

output
```
(x*(a*d*r*Hypergeometric2F1[2, r^(-1), 1 + r^(-1), -((e*x^r)/d)] + a*e*r*x
^r*Hypergeometric2F1[2, r^(-1), 1 + r^(-1), -((e*x^r)/d)] - b*n*(-1 + r)*(
d + e*x^r)*HypergeometricPFQ[{1, r^(-1), r^(-1)}, {1 + r^(-1), 1 + r^(-1)}
, -((e*x^r)/d)] + b*d*Log[c*x^n] - b*(d + e*x^r)*Hypergeometric2F1[1, r^(-
1), 1 + r^(-1), -((e*x^r)/d)]*(n - (-1 + r)*Log[c*x^n])))/(d^2*r*(d + e*x^
r))
```

3.418.3 Rubi [N/A]

Not integrable

Time = 0.18 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2768}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}dx$$

$$\Big\downarrow \text{ 2768}$$

$$\int \frac{a+b\log(cx^n)}{(d+ex^r)^2}dx$$

input
```
Int[(a + b*Log[c*x^n])/(d + e*x^r)^2,x]
```

output
```
$Aborted
```

3.418.3.1 Defintions of rubi rules used

rule 2768
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^(
q_.), x_Symbol] :> Unintegrable[(d + e*x^r)^q*(a + b*Log[c*x^n])^p, x] /; F
reeQ[{a, b, c, d, e, n, p, q, r}, x]
```

3.418.4 Maple [N/A]

Not integrable

Time = 0.05 (sec) , antiderivative size = 20, normalized size of antiderivative = 1.00

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{\left(d+e\,x^{r}\right)^{2}}dx$$

input
```
int((a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int((a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

3.418.5 Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.75

$$\int \frac{a+b\log\left(cx^{n}\right)}{\left(d+ex^{r}\right)^{2}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex^{r}+d\right)^{2}}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^(2*r) + 2*d*e*x^r + d^2), x)
```

3.418.6 Sympy [N/A]

Not integrable

Time = 9.13 (sec) , antiderivative size = 19, normalized size of antiderivative = 0.95

$$\int \frac{a+b\log\left(cx^{n}\right)}{\left(d+ex^{r}\right)^{2}}\,dx=\int \frac{a+b\log\left(cx^{n}\right)}{\left(d+ex^{r}\right)^{2}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

3.418.7 Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^r\right)^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^r+d\right)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^r + d)^2, x)
```

3.418.8 Giac [N/A]

Not integrable

Time = 0.40 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^r\right)^2}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(ex^r+d\right)^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(e*x^r + d)^2, x)
```

3.418.9 Mupad [N/A]

Not integrable

Time = 0.56 (sec) , antiderivative size = 22, normalized size of antiderivative = 1.10

$$\int \frac{a+b\log\left(cx^n\right)}{\left(d+ex^r\right)^2}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{\left(d+e\,x^r\right)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(d + e*x^r)^2,x)
```

output
```
int((a + b*log(c*x^n))/(d + e*x^r)^2, x)
```

3.419 $\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}\,dx$

3.419.1 Optimal result

Integrand size = 23, antiderivative size = 23

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}\,dx = \text{Int}\left(\frac{a+b\log(cx^n)}{x^2(d+ex^r)^2},x\right)$$

output
```
Unintegrable((a+b*ln(c*x^n))/x^2/(d+e*x^r)^2,x)
```

3.419.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 135 vs. 2(26) = 52.

Time = 0.14 (sec) , antiderivative size = 135, normalized size of antiderivative = 5.87

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}\,dx = \frac{-bn(1+r)(d+ex^r)\,{}_3F_2\left(1,-\frac{1}{r},-\frac{1}{r};1-\frac{1}{r},1-\frac{1}{r};-\frac{ex^r}{d}\right)+d(a+b\log(cx^n))-(d+ex^r)\,\text{Hypergeometric}}{d^2rx(d+ex^r)}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x^2*(d + e*x^r)^2),x]
```

output
```
(-(b*n*(1 + r)*(d + e*x^r)*HypergeometricPFQ[{1, -r^(-1), -r^(-1)}, {1 - r
^(-1), 1 - r^(-1)}, -((e*x^r)/d)]) + d*(a + b*Log[c*x^n]) - (d + e*x^r)*Hy
pergeometric2F1[1, -r^(-1), (-1 + r)/r, -((e*x^r)/d)]*(a - b*n + a*r + b*(
1 + r)*Log[c*x^n]))/(d^2*r*x*(d + e*x^r))
```

3.419.3 Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}\,dx$$

$$\Big\downarrow \; 2796$$

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}dx$$

input
```
Int[(a + b*Log[c*x^n])/(x^2*(d + e*x^r)^2),x]
```

output
```
$Aborted
```

3.419.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.419.4 Maple [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 23, normalized size of antiderivative = 1.00

$$\int \frac{a+b\ln(c\,x^n)}{x^2(d+e\,x^r)^2}dx$$

input
```
int((a+b*ln(c*x^n))/x^2/(d+e*x^r)^2,x)
```

output
```
int((a+b*ln(c*x^n))/x^2/(d+e*x^r)^2,x)
```

3.419.5 Fricas [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.96

$$\int \frac{a + b\log\left(cx^n\right)}{x^2\left(d + ex^r\right)^2}\,dx = \int \frac{b\log\left(cx^n\right) + a}{\left(ex^r + d\right)^2 x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)/(e^2*x^2*x^(2*r) + 2*d*e*x^2*x^r + d^2*x^2), x
)
```

3.419.6 Sympy [N/A]

Not integrable

Time = 54.17 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.96

$$\int \frac{a + b\log\left(cx^n\right)}{x^2\left(d + ex^r\right)^2}\,dx = \int \frac{a + b\log\left(cx^n\right)}{x^2\left(d + ex^r\right)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x**2/(d+e*x**r)**2,x)
```

output
```
Integral((a + b*log(c*x**n))/(x**2*(d + e*x**r)**2), x)
```

3.419.7 Maxima [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a + b\log\left(cx^n\right)}{x^2\left(d + ex^r\right)^2}\,dx = \int \frac{b\log\left(cx^n\right) + a}{\left(ex^r + d\right)^2 x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x^2), x)
```

3.419.8 Giac [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^2x^2}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x^2/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x^2), x)
```

3.419.9 Mupad [N/A]

Not integrable

Time = 0.47 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.09

$$\int \frac{a+b\log(cx^n)}{x^2(d+ex^r)^2}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x^2\,(d+e\,x^r)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^r)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x^2*(d + e*x^r)^2), x)
```

3.420 $\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\,dx$

3.420.1 Optimal result

Integrand size = 25, antiderivative size = 37

$$\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\,dx=\frac{a\log(1-cx^n)}{cn}-\frac{b\,\text{PolyLog}(2,1-cx^n)}{cn}$$

output
```
a*ln(1-c*x^n)/c/n-b*polylog(2,1-c*x^n)/c/n
```

3.420.2 Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.00

$$\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\,dx=\frac{(a+b\log(cx^n))\log(1-cx^n)+b\,\text{PolyLog}(2,cx^n)}{cn}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(c - x^(-n))),x]
```

output
```
((a + b*Log[c*x^n])*Log[1 - c*x^n] + b*PolyLog[2, c*x^n])/(c*n)
```

3.420.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 35, normalized size of antiderivative = 0.95, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {2005, 2774, 25, 2753, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}dx$$

$$\Big\downarrow \text{2005}$$

$$\int \frac{x^{n-1}(a+b\log(cx^n))}{cx^n-1}dx$$

$$\Big\downarrow \text{2774}$$

$$\frac{\int -\frac{a+b\log(cx^n)}{1-cx^n}dx^n}{n}$$

$$\Big\downarrow \text{25}$$

$$-\frac{\int \frac{a+b\log(cx^n)}{1-cx^n}dx^n}{n}$$

$$\Big\downarrow \text{2753}$$

$$\frac{\frac{a\log(1-cx^n)}{c}-b\int \frac{\log(cx^n)}{1-cx^n}dx^n}{n}$$

$$\Big\downarrow \text{2752}$$

$$\frac{\frac{a\log(1-cx^n)}{c}-\frac{b\,\text{PolyLog}(2,1-cx^n)}{c}}{n}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(c - x^(-n))),x]
```

output
```
((a*Log[1 - c*x^n])/c - (b*PolyLog[2, 1 - c*x^n])/c)/n
```

3.420.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 2005
```
Int[(Fx_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[x^(m
+ n*p)*(b + a/x^n)^p*Fx, x] /; FreeQ[{a, b, m, n}, x] && IntegerQ[p] && Neg
Q[n]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2753
```
Int[((a_.) + Log[(c_.)*(x_)]*(b_.))/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[
(a + b*Log[(-c)*(d/e)])*(Log[d + e*x]/e), x] + Simp[b   Int[Log[(-e)*(x/d)]
/(d + e*x), x], x] /; FreeQ[{a, b, c, d, e}, x] && GtQ[(-c)*(d/e), 0]
```

rule 2774
```
Int[((a_.) + Log[(c_.)*(x_)^(n_)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) + (
e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m/n   Subst[Int[(d + e*x)^q*(a +
 b*Log[c*x])^p, x], x, x^n], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x]
 && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || GtQ[f, 0]) && EqQ[r, n]
```

3.420.4 Maple [A] (verified)

Time = 0.51 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.84

method	result
derivativedivides	$\frac{\frac{a\ln(c\,x^{n}-1)}{c}-\frac{b\,\mathrm{dilog}(c\,x^{n})}{c}}{n}$
default	$\frac{\frac{a\ln(c\,x^{n}-1)}{c}-\frac{b\,\mathrm{dilog}(c\,x^{n})}{c}}{n}$
parts	$\frac{a\ln(c\,x^{n}-1)}{nc}-\frac{b\,\mathrm{dilog}(c\,x^{n})}{nc}$
risch	$\frac{b\ln(1-c\,x^{n})\ln(x^{n})}{nc}-\frac{b\ln(1-c\,x^{n})\ln(c\,x^{n})}{nc}-\frac{b\,\mathrm{dilog}(c\,x^{n})}{nc}+\frac{\left(-\frac{ib\pi\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^{n})\,\mathrm{csgn}(ic\,x^{n})}{2}+\frac{ib\pi\ \mathrm{csgn}(ic)\,\mathrm{csgn}}{2}\right.}{}$

input
```
int((a+b*ln(c*x^n))/x/(c-1/(x^n)),x,method=_RETURNVERBOSE)
```

output
```
1/n*(1/c*a*ln(c*x^n-1)-1/c*b*dilog(c*x^n))
```

3.420.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 45, normalized size of antiderivative = 1.22

$$\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\,dx = \frac{bn\log(-cx^n+1)\log(x)+b\mathrm{Li}_2(cx^n)+(b\log(c)+a)\log(cx^n-1)}{cn}$$

input
```
integrate((a+b*log(c*x^n))/x/(c-1/(x^n)),x, algorithm="fricas")
```

output
```
(b*n*log(-c*x^n + 1)*log(x) + b*dilog(c*x^n) + (b*log(c) + a)*log(c*x^n -
1))/(c*n)
```

3.420.6 Sympy [F(-2)]

Exception generated.

$$\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*ln(c*x**n))/x/(c-1/(x**n)),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

3.420.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(c-x^{-n})}\,dx = \int \frac{b\log(cx^n)+a}{\left(c-\frac{1}{x^n}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(c-1/(x^n)),x, algorithm="maxima")
```

output
```
b*integrate((x^n*log(c) + x^n*log(x^n))/(c*x*x^n - x), x) + a*log((c*x^n -
1)/c)/(c*n)
```

3.420.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(c-x^{-n}\right)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{\left(c-\frac{1}{x^n}\right)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(c-1/(x^n)),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((c - 1/x^n)*x), x)
```

3.420.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(c-x^{-n}\right)}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(c-\frac{1}{x^n}\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(c - 1/x^n)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(c - 1/x^n)), x)
```

3.421 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx$

3.421.1 Optimal result

Integrand size = 23, antiderivative size = 152

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x}\,dx = -\frac{3bd^2enx^r}{r^2}-\frac{3bde^2nx^{2r}}{4r^2}-\frac{be^3nx^{3r}}{9r^2}-\frac{1}{2}bd^3n\log^2(x)+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}+d^3\log(x)\,(a+b\log(cx^n))$$

output
```
-3*b*d^2*e*n*x^r/r^2-3/4*b*d*e^2*n*x^(2*r)/r^2-1/9*b*e^3*n*x^(3*r)/r^2-1/2
*b*d^3*n*ln(x)^2+3*d^2*e*x^r*(a+b*ln(c*x^n))/r+3/2*d*e^2*x^(2*r)*(a+b*ln(c
*x^n))/r+1/3*e^3*x^(3*r)*(a+b*ln(c*x^n))/r+d^3*ln(x)*(a+b*ln(c*x^n))
```

3.421.2 Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 132, normalized size of antiderivative = 0.87

$$\int \frac{(d+ex^r)^3\,(a+b\log(cx^n))}{x}\,dx = ad^3\log(x)+\frac{1}{36}\left(\frac{ex^r(6ar(18d^2+9dex^r+2e^2x^{2r})-bn(108d^2+27dex^r+4e^2x^{2r}))}{r^2}+\frac{6bex^r(18d^2+9dex^r+2e^2x^{2r})\log(cx^n)}{r}+\frac{18bd^3\log^2(cx^n)}{n}\right)$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
a*d^3*Log[x] + ((e*x^r*(6*a*r*(18*d^2 + 9*d*e*x^r + 2*e^2*x^(2*r)) - b*n*(
108*d^2 + 27*d*e*x^r + 4*e^2*x^(2*r))))/r^2 + (6*b*e*x^r*(18*d^2 + 9*d*e*x
^r + 2*e^2*x^(2*r))*Log[c*x^n])/r + (18*b*d^3*Log[c*x^n]^2)/n)/36
```

3.421.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 153, normalized size of antiderivative = 1.01, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.174, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}dx$$

$$\Big\downarrow \text{2772}$$

$$-bn\int \frac{e(9dex^r+2e^2x^{2r}+18d^2)x^r+6d^3r\log(x)}{6rx}dx+d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}$$

$$\Big\downarrow \text{27}$$

$$-\frac{bn\int \frac{e(9dex^r+2e^2x^{2r}+18d^2)x^r+6d^3r\log(x)}{x}dx}{6r}+d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}$$

$$\Big\downarrow \text{2010}$$

$$-\frac{bn\int \left(18d^2ex^{r-1}+9de^2x^{2r-1}+2e^3x^{3r-1}+\frac{6d^3r\log(x)}{x}\right)dx}{6r}+d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}$$

$$\Big\downarrow \text{2009}$$

$$d^3\log(x)(a+b\log(cx^n))+\frac{3d^2ex^r(a+b\log(cx^n))}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{3r}-\frac{bn\left(3d^3r\log^2(x)+\frac{18d^2ex^r}{r}+\frac{9de^2x^{2r}}{2r}+\frac{2e^3x^{3r}}{3r}\right)}{6r}$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n]))/x,x]
```

output
```
-1/6*(b*n*((18*d^2*e*x^r)/r + (9*d*e^2*x^(2*r))/(2*r) + (2*e^3*x^(3*r))/(3
*r) + 3*d^3*r*Log[x]^2))/r + (3*d^2*e*x^r*(a + b*Log[c*x^n]))/r + (3*d*e^2
*x^(2*r)*(a + b*Log[c*x^n]))/(2*r) + (e^3*x^(3*r)*(a + b*Log[c*x^n]))/(3*r
) + d^3*Log[x]*(a + b*Log[c*x^n])
```

3.421.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.421.4 Maple [A] (verified)

Time = 0.00 (sec) , antiderivative size = 177, normalized size of antiderivative = 1.16

method	result
parallelrisch	$\frac{12e^3b\ln(cx^n)x^{3r}nr+12x^{3r}ae^3nr-4x^{3r}be^3n^2+54bde^2\ln(cx^n)x^{2r}nr+36\ln(x)ad^3nr^2+54x^{2r}ade^2nr-27x^{2r}bde^2n^2+108b}{36nr^2}$
risch	$-\frac{3bd^2enx^r}{r^2}-\frac{3bde^2nx^{2r}}{4r^2}-\frac{be^3nx^{3r}}{9r^2}-\frac{i\ln(x)\pi bd^3\operatorname{csgn}(ic)\operatorname{csgn}(ix^n)\operatorname{csgn}(icx^n)}{2}-\frac{i\pi be^3\operatorname{csgn}(icx^n)^3x^{3r}}{6r}+\ln($

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/36*(12*e^3*b*ln(c*x^n)*(x^r)^3*n*r+12*(x^r)^3*a*e^3*n*r-4*(x^r)^3*b*e^3*
n^2+54*b*d*e^2*ln(c*x^n)*(x^r)^2*n*r+36*ln(x)*a*d^3*n*r^2+54*(x^r)^2*a*d*e
^2*n*r-27*(x^r)^2*b*d*e^2*n^2+108*b*d^2*e*ln(c*x^n)*x^r*n*r+18*b*d^3*ln(c*
x^n)^2*r^2+108*x^r*a*d^2*e*n*r-108*x^r*b*d^2*e*n^2)/n/r^2
```

3.421.5 Fricas [A] (verification not implemented)

Time = 0.25 (sec) , antiderivative size = 169, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx$$
$$= \frac{18\,bd^3nr^2\log(x)^2 + 4\,(3\,be^3nr\log(x) + 3\,be^3r\log(c) - be^3n + 3\,ae^3r)x^{3\,r} + 27\,(2\,bde^2nr\log(x) + 2\,bde^2r}{}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/36*(18*b*d^3*n*r^2*log(x)^2 + 4*(3*b*e^3*n*r*log(x) + 3*b*e^3*r*log(c) -
 b*e^3*n + 3*a*e^3*r)*x^(3*r) + 27*(2*b*d*e^2*n*r*log(x) + 2*b*d*e^2*r*log
(c) - b*d*e^2*n + 2*a*d*e^2*r)*x^(2*r) + 108*(b*d^2*e*n*r*log(x) + b*d^2*e
*r*log(c) - b*d^2*e*n + a*d^2*e*r)*x^r + 36*(b*d^3*r^2*log(c) + a*d^3*r^2)
*log(x))/r^2
```

3.421.6 Sympy [A] (verification not implemented)

Time = 2.79 (sec) , antiderivative size = 299, normalized size of antiderivative = 1.97

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx$$
$$= \begin{cases} (a+b\log(c))\,(d+e)^3\log(x) \\ (a+b\log(c))\left(d^3\log(x) + \frac{3d^2ex^r}{r} + \frac{3de^2x^{2r}}{2r} + \frac{e^3x^{3r}}{3r}\right) \\ (d+e)^3\left(\begin{cases} a\log(x) & \text{for}\ b=0 \\ -(-a-b\log(c))\log(x) & \text{for}\ n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right) \\ \frac{ad^3\log(cx^n)}{n} + \frac{3ad^2ex^r}{r} + \frac{3ade^2x^{2r}}{2r} + \frac{ae^3x^{3r}}{3r} + \frac{bd^3\log(cx^n)^2}{2n} - \frac{3bd^2enx^r}{r^2} + \frac{3bd^2ex^r\log(cx^n)}{r} - \frac{3bde^2nx^{2r}}{4r^2} + \frac{3bde^2x^{2r}\log(c}{2r} \end{cases}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise(((a + b*log(c))*(d + e)**3*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b
*log(c))*(d**3*log(x) + 3*d**2*e*x**r/r + 3*d*e**2*x**(2*r)/(2*r) + e**3*x
**(3*r)/(3*r)), Eq(n, 0)), ((d + e)**3*Piecewise((a*log(x), Eq(b, 0)), (-(
-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*n), True))
, Eq(r, 0)), (a*d**3*log(c*x**n)/n + 3*a*d**2*e*x**r/r + 3*a*d*e**2*x**(2*
r)/(2*r) + a*e**3*x**(3*r)/(3*r) + b*d**3*log(c*x**n)**2/(2*n) - 3*b*d**2*
e*n*x**r/r**2 + 3*b*d**2*e*x**r*log(c*x**n)/r - 3*b*d*e**2*n*x**(2*r)/(4*r
**2) + 3*b*d*e**2*x**(2*r)*log(c*x**n)/(2*r) - b*e**3*n*x**(3*r)/(9*r**2)
+ b*e**3*x**(3*r)*log(c*x**n)/(3*r), True))
```

3.421.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 172, normalized size of antiderivative = 1.13

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx = \frac{be^3x^{3r}\log(cx^n)}{3r} + \frac{3bde^2x^{2r}\log(cx^n)}{2r} + \frac{3bd^2ex^r\log(cx^n)}{r} + \frac{bd^3\log(cx^n)^2}{2n} + ad^3\log(x) - \frac{be^3nx^{3r}}{9r^2} + \frac{ae^3x^{3r}}{3r} - \frac{3bde^2nx^{2r}}{4r^2} + \frac{3ade^2x^{2r}}{2r} - \frac{3bd^2enx^r}{r^2} + \frac{3ad^2ex^r}{r}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/3*b*e^3*x^(3*r)*log(c*x^n)/r + 3/2*b*d*e^2*x^(2*r)*log(c*x^n)/r + 3*b*d^
2*e*x^r*log(c*x^n)/r + 1/2*b*d^3*log(c*x^n)^2/n + a*d^3*log(x) - 1/9*b*e^3
*n*x^(3*r)/r^2 + 1/3*a*e^3*x^(3*r)/r - 3/4*b*d*e^2*n*x^(2*r)/r^2 + 3/2*a*d
*e^2*x^(2*r)/r - 3*b*d^2*e*n*x^r/r^2 + 3*a*d^2*e*x^r/r
```

3.421.8 Giac [F]

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^r+d)^3(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)/x, x)
```

3.421.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))}{x}\,dx = \int \frac{(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n)))/x, x)
```

3.422 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx$

3.422.1 Optimal result

Integrand size = 23, antiderivative size = 104

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx = -\frac{2bdenx^r}{r^2}-\frac{be^2nx^{2r}}{4r^2}-\frac{1}{2}bd^2n\log^2(x)+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}+d^2\log(x)(a+b\log(cx^n))$$

output
```
-2*b*d*e*n*x^r/r^2-1/4*b*e^2*n*x^(2*r)/r^2-1/2*b*d^2*n*ln(x)^2+2*d*e*x^r*(
a+b*ln(c*x^n))/r+1/2*e^2*x^(2*r)*(a+b*ln(c*x^n))/r+d^2*ln(x)*(a+b*ln(c*x^n
))
```

3.422.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 90, normalized size of antiderivative = 0.87

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx = \frac{1}{4}\left(\frac{ex^r(2ar(4d+ex^r)-bn(8d+ex^r))}{r^2}+4ad^2\log(x)+\frac{2bex^r(4d+ex^r)\log(cx^n)}{r}+\frac{2bd^2\log^2(cx^n)}{n}\right)$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
((e*x^r*(2*a*r*(4*d + e*x^r) - b*n*(8*d + e*x^r)))/r^2 + 4*a*d^2*Log[x] +
(2*b*e*x^r*(4*d + e*x^r)*Log[c*x^n])/r + (2*b*d^2*Log[c*x^n]^2)/n)/4
```

3.422.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.02, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.174$, Rules used = {2772, 27, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))}{x} \, dx$$

$$\Big\downarrow \; 2772$$

$$-bn\int \frac{e(ex^r+4d)x^r+2d^2r\log(x)}{2rx}dx+d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}$$

$$\Big\downarrow \; 27$$

$$-\frac{bn\int \frac{e(ex^r+4d)x^r+2d^2r\log(x)}{x}dx}{2r}+d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}$$

$$\Big\downarrow \; 2010$$

$$-\frac{bn\int \left(4dex^{r-1}+e^2x^{2r-1}+\frac{2d^2r\log(x)}{x}\right)dx}{2r}+d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}$$

$$\Big\downarrow \; 2009$$

$$d^2\log(x)(a+b\log(cx^n))+\frac{2dex^r(a+b\log(cx^n))}{r}+\frac{e^2x^{2r}(a+b\log(cx^n))}{2r}-\frac{bn\left(d^2r\log^2(x)+\frac{4dex^r}{r}+\frac{e^2x^{2r}}{2r}\right)}{2r}$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n]))/x,x]
```

output
```
-1/2*(b*n*((4*d*e*x^r)/r + (e^2*x^(2*r))/(2*r) + d^2*r*Log[x]^2))/r + (2*d
*e*x^r*(a + b*Log[c*x^n]))/r + (e^2*x^(2*r)*(a + b*Log[c*x^n]))/(2*r) + d^
2*Log[x]*(a + b*Log[c*x^n])
```

3.422.3.1 Defintions of rubi rules used

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] &&  !LinearQ[u, x] &&  !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

rule 2772
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(x_)^(m_.)*((d_) + (e_.)*(x_)^(r_
.))^(q_.), x_Symbol] :> With[{u = IntHide[x^m*(d + e*x^r)^q, x]}, Simp[(a +
 b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x, x], x], x]]
/; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[q, 0] && IntegerQ[m] &&  !(EqQ[q
, 1] && EqQ[m, -1])
```

3.422.4 Maple [A] (verified)

Time = 0.00 (sec) , antiderivative size = 122, normalized size of antiderivative = 1.17

method	result
parallelrisch	$\frac{2x^{2r}\ln(c\,x^{n})b\,e^{2}rn+4\ln(x)a\,d^{2}n\,r^{2}+2x^{2r}a\,e^{2}nr-x^{2r}b\,e^{2}n^{2}+8x^{r}\ln(c\,x^{n})bdern+2b\,d^{2}\ln(c\,x^{n})^{2}r^{2}+8x^{r}adenr-8x^{r}bde\,n^{2}}{4r^{2}n}$
risch	$\frac{b(2d^{2}\ln(x)r+e^{2}x^{2r}+4de\,x^{r})\ln(x^{n})}{2r}+\frac{i\pi b\,e^{2}\,\mathrm{csgn}(ix^{n})\,\mathrm{csgn}(ic\,x^{n})^{2}x^{2r}}{4r}-\frac{i\pi bde\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^{n})\,\mathrm{csgn}(ic\,x^{n})x^{r}}{r}-$

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/4*(2*(x^r)^2*ln(c*x^n)*b*e^2*r*n+4*ln(x)*a*d^2*n*r^2+2*(x^r)^2*a*e^2*n*r
-(x^r)^2*b*e^2*n^2+8*x^r*ln(c*x^n)*b*d*e*r*n+2*b*d^2*ln(c*x^n)^2*r^2+8*x^r
*a*d*e*n*r-8*x^r*b*d*e*n^2)/r^2/n
```

3.422.5 Fricas [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 115, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx = \frac{2\,bd^2nr^2\log(x)^2+(2\,be^2nr\log(x)+2\,be^2r\log(c)-be^2n+2\,ae^2r)x^{2\,r}+8\,(bdenr\log(x)+bder\log(c)-}{4\,r^2}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/4*(2*b*d^2*n*r^2*log(x)^2 + (2*b*e^2*n*r*log(x) + 2*b*e^2*r*log(c) - b*e
^2*n + 2*a*e^2*r)*x^(2*r) + 8*(b*d*e*n*r*log(x) + b*d*e*r*log(c) - b*d*e*n
 + a*d*e*r)*x^r + 4*(b*d^2*r^2*log(c) + a*d^2*r^2)*log(x))/r^2
```

3.422.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 216 vs. $2(104) = 208$.

Time = 2.35 (sec) , antiderivative size = 216, normalized size of antiderivative = 2.08

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))}{x}\,dx = \begin{cases} (a+b\log(c))(d+e)^2\log(x) & \text{for } n=0 \wedge \\ (a+b\log(c))\left(d^2\log(x)+\frac{2dex^r}{r}+\frac{e^2x^{2r}}{2r}\right) & \text{for } n=0 \\ (d+e)^2\left(\begin{cases} a\log(x) & \text{for } b=0 \\ -(-a-b\log(c))\log(x) & \text{for } n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right) & \text{for } r=0 \\ \frac{ad^2\log(cx^n)}{n}+\frac{2adex^r}{r}+\frac{ae^2x^{2r}}{2r}+\frac{bd^2\log(cx^n)^2}{2n}-\frac{2bdenx^r}{r^2}+\frac{2bdex^r\log(cx^n)}{r}-\frac{be^2nx^{2r}}{4r^2}+\frac{be^2x^{2r}\log(cx^n)}{2r} & \text{otherwise} \end{cases}$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise(((a + b*log(c))*(d + e)**2*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b
*log(c))*(d**2*log(x) + 2*d*e*x**r/r + e**2*x**(2*r)/(2*r)), Eq(n, 0)), ((
d + e)**2*Piecewise((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n,
0)), ((-a - b*log(c*x**n))**2/(2*b*n), True)), Eq(r, 0)), (a*d**2*log(c*x*
*n)/n + 2*a*d*e*x**r/r + a*e**2*x**(2*r)/(2*r) + b*d**2*log(c*x**n)**2/(2*
n) - 2*b*d*e*n*x**r/r**2 + 2*b*d*e*x**r*log(c*x**n)/r - b*e**2*n*x**(2*r)/
(4*r**2) + b*e**2*x**(2*r)*log(c*x**n)/(2*r), True))
```

3.422.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 114, normalized size of antiderivative = 1.10

$$\int \frac{(d+ex^r)^2\,(a+b\log{(cx^n)})}{x}\,dx = \frac{be^2x^{2\,r}\log{(cx^n)}}{2\,r} + \frac{2\,bdex^r\log{(cx^n)}}{r} + \frac{bd^2\log{(cx^n)}^2}{2\,n} + ad^2\log{(x)} - \frac{be^2nx^{2\,r}}{4\,r^2} + \frac{ae^2x^{2\,r}}{2\,r} - \frac{2\,bdenx^r}{r^2} + \frac{2\,adex^r}{r}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/2*b*e^2*x^(2*r)*log(c*x^n)/r + 2*b*d*e*x^r*log(c*x^n)/r + 1/2*b*d^2*log(
c*x^n)^2/n + a*d^2*log(x) - 1/4*b*e^2*n*x^(2*r)/r^2 + 1/2*a*e^2*x^(2*r)/r
- 2*b*d*e*n*x^r/r^2 + 2*a*d*e*x^r/r
```

3.422.8 Giac [F]

$$\int \frac{(d+ex^r)^2\,(a+b\log{(cx^n)})}{x}\,dx = \int \frac{(ex^r+d)^2(b\log{(cx^n)}+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)/x, x)
```

3.422.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log (cx^n))}{x}\, dx = \int \frac{(d+e\,x^r)^2\, (a+b\,\ln (c\,x^n))}{x}\, dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n)))/x, x)
```

3.423 $\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx$

3.423.1 Optimal result

Integrand size = 21, antiderivative size = 53

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x}\,dx = -\frac{benx^r}{r^2}+\frac{ex^r(a+b\log{(cx^n)})}{r}+\frac{d(a+b\log{(cx^n)})^2}{2bn}$$

output
```
-b*e*n*x^r/r^2+e*x^r*(a+b*ln(c*x^n))/r+1/2*d*(a+b*ln(c*x^n))^2/b/n
```

3.423.2 Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.02

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x}\,dx = \frac{e(-bn+ar)x^r}{r^2}+ad\log(x)+\frac{bex^r\log{(cx^n)}}{r}+\frac{bd\log^2{(cx^n)}}{2n}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(e*(-(b*n) + a*r)*x^r)/r^2 + a*d*Log[x] + (b*e*x^r*Log[c*x^n])/r + (b*d*Lo
g[c*x^n]^2)/(2*n)
```

3.423.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {2793, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx$$

$$\Big\downarrow \text{2793}$$

$$\int \left(\frac{d(a+b\log(cx^n))}{x}+ex^{r-1}(a+b\log(cx^n))\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{d(a+b\log(cx^n))^2}{2bn}+\frac{ex^r(a+b\log(cx^n))}{r}-\frac{benx^r}{r^2}$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n]))/x,x]
```

output
```
-((b*e*n*x^r)/r^2) + (e*x^r*(a + b*Log[c*x^n]))/r + (d*(a + b*Log[c*x^n])^
2)/(2*b*n)
```

3.423.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2793
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[a + b*Log[c*x^n],
 (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b, c, d, e,
 f, m, n, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IntegerQ[m] && Integer
Q[r]))
```

3.423.4 Maple [A] (verified)

Time = 0.01 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.28

method	result
parallelrisch	$\frac{2\ln(x)adn\,r^2+2x^r\ln(c\,x^n)bern+bd\ln(c\,x^n)^2r^2+2x^r aenr-2x^r be\,n^2}{2r^2n}$
risch	$\frac{b(dr\ln(x)+e\,x^r)\ln(x^n)}{r}-\frac{i\ln(x)\pi bd\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)}{2}+\frac{i\ln(x)\pi bd\,\mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2}{2}+\frac{i\ln(x)\pi bd\,\mathrm{csgn}(}{}$

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))/x,x,method=_RETURNVERBOSE)
```

output
```
1/2*(2*ln(x)*a*d*n*r^2+2*x^r*ln(c*x^n)*b*e*r*n+b*d*ln(c*x^n)^2*r^2+2*x^r*a
*e*n*r-2*x^r*b*e*n^2)/r^2/n
```

3.423.5 Fricas [A] (verification not implemented)

Time = 0.27 (sec) , antiderivative size = 64, normalized size of antiderivative = 1.21

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x}\,dx$$
$$=\frac{bdnr^2\log{(x)}^2+2\,(benr\log{(x)}+ber\log{(c)}-ben+aer)x^r+2\,(bdr^2\log{(c)}+adr^2)\log{(x)}}{2\,r^2}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
1/2*(b*d*n*r^2*log(x)^2 + 2*(b*e*n*r*log(x) + b*e*r*log(c) - b*e*n + a*e*r
)*x^r + 2*(b*d*r^2*log(c) + a*d*r^2)*log(x))/r^2
```

3.423.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 131 vs. 2(46) = 92.

Time = 2.27 (sec) , antiderivative size = 131, normalized size of antiderivative = 2.47

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx = \begin{cases} (a+b\log(c))(d+e)\log(x) & \text{for } n=0 \wedge r=0 \\ (a+b\log(c))\left(d\log(x)+\frac{ex^r}{r}\right) & \text{for } n=0 \\ (d+e)\left(\begin{cases} a\log(x) & \text{for } b=0 \\ -(-a-b\log(c))\log(x) & \text{for } n=0 \\ \frac{(-a-b\log(cx^n))^2}{2bn} & \text{otherwise} \end{cases}\right) & \text{for } r=0 \\ \frac{ad\log(cx^n)}{n}+\frac{aex^r}{r}+\frac{bd\log(cx^n)^2}{2n}-\frac{benx^r}{r^2}+\frac{bex^r\log(cx^n)}{r} & \text{otherwise} \end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))/x,x)
```

output
```
Piecewise(((a + b*log(c))*(d + e)*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b*lo
g(c))*(d*log(x) + e*x**r/r), Eq(n, 0)), ((d + e)*Piecewise((a*log(x), Eq(b
, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c*x**n))**2/(2*b*
n), True)), Eq(r, 0)), (a*d*log(c*x**n)/n + a*e*x**r/r + b*d*log(c*x**n)**
2/(2*n) - b*e*n*x**r/r**2 + b*e*x**r*log(c*x**n)/r, True))
```

3.423.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.06

$$\int \frac{(d+ex^r)(a+b\log(cx^n))}{x}\,dx = \frac{bex^r\log(cx^n)}{r}+\frac{bd\log(cx^n)^2}{2\,n}+ad\log(x)-\frac{benx^r}{r^2}+\frac{aex^r}{r}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
b*e*x^r*log(c*x^n)/r + 1/2*b*d*log(c*x^n)^2/n + a*d*log(x) - b*e*n*x^r/r^2
 + a*e*x^r/r
```

3.423.8 Giac [F]

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x}\,dx = \int \frac{(ex^r+d)(b\log{(cx^n)}+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)*(b*log(c*x^n) + a)/x, x)
```

3.423.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})}{x}\,dx = \int \frac{(d+e\,x^r)\,\left(a+b\,\ln{(c\,x^n)}\right)}{x}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n)))/x, x)
```

3.424 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx$

3.424.1 Optimal result

Integrand size = 23, antiderivative size = 54

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = -\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{dr}+\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}$$

output
```
-(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d/r+b*n*polylog(2,-d/e/(x^r))/d/r^2
```

3.424.2 Mathematica [A] (warning: unable to verify)

Time = 0.03 (sec) , antiderivative size = 108, normalized size of antiderivative = 2.00

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = \frac{bnr^2\log^2(x)-2r(a+b\log(cx^n))\log(d-dx^r)+2bnr\log(x)(\log(d-dx^r)-\log(d+ex^r))+2bn\log(-\cdots}{2dr^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)),x]
```

output
```
(b*n*r^2*Log[x]^2 - 2*r*(a + b*Log[c*x^n])*Log[d - d*x^r] + 2*b*n*r*Log[x]
*(Log[d - d*x^r] - Log[d + e*x^r]) + 2*b*n*Log[-((e*x^r)/d)]*Log[d + e*x^r
] + 2*b*n*PolyLog[2, 1 + (e*x^r)/d])/(2*d*r^2)
```

3.424.3 Rubi [A] (verified)

Time = 0.27 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx$$

$$\Big\downarrow \text{2779}$$

$$\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}$$

$$\Big\downarrow \text{2838}$$

$$\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)),x]
```

output
```
-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*PolyLog[2, -(d/(e*
x^r))])/(d*r^2)
```

3.424.3.1 Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.424.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.00 (sec) , antiderivative size = 246, normalized size of antiderivative = 4.56

method	result
risch	$\frac{b\ln(d+e\,x^r)n\ln(x)}{rd}-\frac{b\ln(d+e\,x^r)\ln(x^n)}{rd}-\frac{b\ln(x^r)n\ln(x)}{rd}+\frac{b\ln(x^r)\ln(x^n)}{rd}+\frac{bn\ln(x)^2}{2d}-\frac{bn\ln(x)\ln\left(1+\frac{e\,x^r}{d}\right)}{rd}-\frac{bn\ \mathrm{Li}_2}{}$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r),x,method=_RETURNVERBOSE)
```

output
```
b/r/d*ln(d+e*x^r)*n*ln(x)-b/r/d*ln(d+e*x^r)*ln(x^n)-b/r/d*ln(x^r)*n*ln(x)+
b/r/d*ln(x^r)*ln(x^n)+1/2*b*n/d*ln(x)^2-b/r*n/d*ln(x)*ln(1+e*x^r/d)-b/r^2*
n/d*polylog(2,-e*x^r/d)+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1
/2*I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2
-1/2*I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)*(-1/r/d*ln(d+e*x^r)+1/r/d*ln(x^r))
```

3.424.5 Fricas [A] (verification not implemented)

Time = 0.28 (sec) , antiderivative size = 93, normalized size of antiderivative = 1.72

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = \frac{bnr^2\log(x)^2-2\,bnr\log(x)\log\left(\frac{ex^r+d}{d}\right)-2\,bn\mathrm{Li}_2\left(-\frac{ex^r+d}{d}+1\right)-2\,(br\log(c)+ar)\log(ex^r+d)+2\,(br^2}{2\,dr^2}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="fricas")
```

output
```
1/2*(b*n*r^2*log(x)^2 - 2*b*n*r*log(x)*log((e*x^r + d)/d) - 2*b*n*dilog(-(
e*x^r + d)/d + 1) - 2*(b*r*log(c) + a*r)*log(e*x^r + d) + 2*(b*r^2*log(c)
+ a*r^2)*log(x))/(d*r^2)
```

3.424.6 Sympy [A] (verification not implemented)

Time = 148.70 (sec) , antiderivative size = 452, normalized size of antiderivative = 8.37

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r),x)
```

output
```
-2*a*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (-log(-2*e*x**r)/(2*e), Tru
e))/(d*r) - 2*a*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (log(2*d + 2*e*x
**r)/(2*e), True))/(d*r) + 2*b*e*n*Piecewise((Piecewise((log(x)/(2*e) + x*
*r/(d*r), Ne(r, 0)), (log(x)/(2*e) + log(x)/d, True)), Eq(e, 0)), (-Piecew
ise((0, (Abs(e*x**r) < 1) & (1/Abs(e*x**r) < 1)), (log(e*x**r)**2/(2*r) +
I*pi*log(e*x**r)/r, Abs(e*x**r) < 1), (log(1/(e*x**r))**2/(2*r) - I*pi*log
(1/(e*x**r))/r, 1/Abs(e*x**r) < 1), (meijerg(((), (1, 1, 1)), ((0, 0, 0),
()), e*x**r*exp_polar(I*pi))/r + meijerg(((1, 1, 1), ()), ((), (0, 0, 0)),
 e*x**r*exp_polar(I*pi))/r, True))/(2*e) - log(2)*log(x)/(2*e), True))/(d*
r) + 2*b*e*n*Piecewise((Piecewise((log(x)/(2*e) + x**r/(d*r), Ne(r, 0)), (
log(x)/(2*e) + log(x)/d, True)), Eq(e, 0)), (Piecewise((-polylog(2, e*x**r
*exp_polar(I*pi)/d)/r, (Abs(x) < 1) & (1/Abs(x) < 1)), (log(d)*log(x) - po
lylog(2, e*x**r*exp_polar(I*pi)/d)/r, Abs(x) < 1), (-log(d)*log(1/x) - pol
ylog(2, e*x**r*exp_polar(I*pi)/d)/r, 1/Abs(x) < 1), (-meijerg(((), (1, 1))
, ((0, 0), ()), x)*log(d) + meijerg(((1, 1), ()), ((), (0, 0)), x)*log(d)
- polylog(2, e*x**r*exp_polar(I*pi)/d)/r, True))/(2*e) + log(2)*log(x)/(2*
e), True))/(d*r) - 2*b*e*Piecewise((1/(2*e) + x**r/d, Eq(e, 0)), (-log(-2*
e*x**r)/(2*e), True))*log(c*x**n)/(d*r) - 2*b*e*Piecewise((1/(2*e) + x**r/
d, Eq(e, 0)), (log(2*d + 2*e*x**r)/(2*e), True))*log(c*x**n)/(d*r)
```

3.424.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="maxima")
```

output
```
a*(log(x)/d - log((e*x^r + d)/e)/(d*r)) + b*integrate((log(c) + log(x^n))/
(e*x*x^r + d*x), x)
```

3.424.8 Giac [F]

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)}\,dx=\int \frac{b\log\left(cx^n\right)+a}{(ex^r+d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)*x), x)
```

3.424.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)}\,dx=\int \frac{a+b\,\ln\left(c\,x^n\right)}{x\,\left(d+e\,x^r\right)}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)), x)
```

3.425 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx$

3.425.1 Optimal result

Integrand size = 23, antiderivative size = 102

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx=-\frac{ex^r(a+b\log(cx^n))}{d^2r(d+ex^r)}-\frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r}+\frac{bn\log(d+ex^r)}{d^2r^2}+\frac{bn\operatorname{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^2r^2}$$

output
```
-e*x^r*(a+b*ln(c*x^n))/d^2/r/(d+e*x^r)-(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d^2
/r+b*n*ln(d+e*x^r)/d^2/r^2+b*n*polylog(2,-d/e/(x^r))/d^2/r^2
```

3.425.2 Mathematica [A] (warning: unable to verify)

Time = 0.09 (sec) , antiderivative size = 132, normalized size of antiderivative = 1.29

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx$$
$$=\frac{\frac{dr(a+b\log(cx^n))}{d+ex^r}+bn\log(d-dx^r)-ar\log(d-dx^r)+br(n\log(x)-\log(cx^n))\log(d-dx^r)+bn\left(\frac{1}{2}r^2\log^2(\right.}{d^2r^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^2),x]
```

output
```
((d*r*(a + b*Log[c*x^n]))/(d + e*x^r) + b*n*Log[d - d*x^r] - a*r*Log[d - d
*x^r] + b*r*(n*Log[x] - Log[c*x^n])*Log[d - d*x^r] + b*n*((r^2*Log[x]^2)/2
 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^
r)/d]))/(d^2*r^2)
```

3.425.3 Rubi [A] (verified)

Time = 0.55 (sec) , antiderivative size = 116, normalized size of antiderivative = 1.14, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.217$, Rules used = {2791, 2773, 792, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}dx$$

$$\Big\downarrow \text{2791}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\int \frac{x^{r-1}(a+b\log(cx^n))}{(ex^r+d)^2}dx}{d}$$

$$\Big\downarrow \text{2773}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\int \frac{x^{r-1}}{ex^r+d}dx}{dr}\right)}{d}$$

$$\Big\downarrow \text{792}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}$$

$$\Big\downarrow \text{2779}$$

$$\frac{\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}$$

$$\Big\downarrow \text{2838}$$

$$\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^2),x]
```

output
```
-((e*((x^r*(a + b*Log[c*x^n]))/(d*r*(d + e*x^r)) - (b*n*Log[d + e*x^r])/(d
*e*r^2)))/d) + (-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*Po
lyLog[2, -(d/(e*x^r))])/(d*r^2))/d
```

3.425.3.1 Defintions of rubi rules used

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.425. $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx$

3.425.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.43 (sec) , antiderivative size = 342, normalized size of antiderivative = 3.35

method	result
risch	$\frac{b\ln(d+e\,x^r)n\ln(x)}{r\,d^2}-\frac{b\ln(d+e\,x^r)\ln(x^n)}{r\,d^2}-\frac{bn\ln(x)}{rd(d+e\,x^r)}+\frac{b\ln(x^n)}{rd(d+e\,x^r)}-\frac{b\ln(x^r)n\ln(x)}{r\,d^2}+\frac{b\ln(x^r)\ln(x^n)}{r\,d^2}+\frac{bn\ln(d+e\,x^r)}{d^2r^2}$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^2,x,method=_RETURNVERBOSE)
```

output
```
b/r/d^2*ln(d+e*x^r)*n*ln(x)-b/r/d^2*ln(d+e*x^r)*ln(x^n)-b/r/d/(d+e*x^r)*n*
ln(x)+b/r/d/(d+e*x^r)*ln(x^n)-b/r/d^2*ln(x^r)*n*ln(x)+b/r/d^2*ln(x^r)*ln(x
^n)+b*n*ln(d+e*x^r)/d^2/r^2-b/r*n*e/d^2*ln(x)*x^r/(d+e*x^r)-b/r^2*n/d^2*di
log((d+e*x^r)/d)-b/r*n/d^2*ln(x)*ln((d+e*x^r)/d)+1/2*b*n/d^2*ln(x)^2+(-1/2
*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*b*Pi*csgn(I*c)*csgn(I*c*
x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*I*b*Pi*csgn(I*c*x^n)^3+b
*ln(c)+a)/r*(-1/d^2*ln(d+e*x^r)+1/d/(d+e*x^r)+1/d^2*ln(x^r))
```

3.425.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 214 vs. 2(101) = 202.

Time = 0.28 (sec) , antiderivative size = 214, normalized size of antiderivative = 2.10

$$\int \frac{a+b\log\left(cx^n\right)}{x\left(d+ex^r\right)^2}\,dx$$
$$=\frac{bdnr^2\log\left(x\right)^2+2\,bdr\log\left(c\right)+2\,adr+\left(benr^2\log\left(x\right)^2+2\left(ber^2\log\left(c\right)-benr+aer^2\right)\log\left(x\right)\right)x^r-2\left(ben\right.}{}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
1/2*(b*d*n*r^2*log(x)^2 + 2*b*d*r*log(c) + 2*a*d*r + (b*e*n*r^2*log(x)^2 +
 2*(b*e*r^2*log(c) - b*e*n*r + a*e*r^2)*log(x))*x^r - 2*(b*e*n*x^r + b*d*n
)*dilog(-(e*x^r + d)/d + 1) - 2*(b*d*r*log(c) - b*d*n + a*d*r + (b*e*r*log
(c) - b*e*n + a*e*r)*x^r)*log(e*x^r + d) + 2*(b*d*r^2*log(c) + a*d*r^2)*lo
g(x) - 2*(b*e*n*r*x^r*log(x) + b*d*n*r*log(x))*log((e*x^r + d)/d))/(d^2*e*
r^2*x^r + d^3*r^2)
```

3.425.6 Sympy [A] (verification not implemented)

Time = 145.56 (sec) , antiderivative size = 360, normalized size of antiderivative = 3.53

$$
\begin{aligned}
\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)^{2}}\,dx &= -\frac{ae\left(\begin{cases}\frac{x^{r}}{d^{2}} & \text{for}\: e=0\\-\frac{1}{de+e^{2}x^{r}} & \text{otherwise}\end{cases}\right)}{dr}-\frac{ae\left(\begin{cases}\frac{x^{r}}{d} & \text{for}\: e=0\\\frac{\log\left(d+ex^{r}\right)}{e} & \text{otherwise}\end{cases}\right)}{d^{2}r} \\
&+\frac{a\log\left(x^{r}\right)}{d^{2}r}+\frac{ben\left(\begin{cases}\frac{\begin{cases}\frac{x^{r}}{r} & \text{for}\: r\neq 0\\\log\left(x\right) & \text{otherwise}\end{cases}}{d^{2}} & \text{for}\: e=0\\-\begin{cases}\frac{\log\left(x\right)}{e^{2}} & \text{for}\: d=0\wedge r=0\\-\frac{x^{-r}}{e^{2}r} & \text{for}\: d=0\\\frac{\log\left(x\right)}{de+e^{2}} & \text{for}\: r=0\\\frac{\log\left(x\right)}{de}-\frac{\log\left(\frac{d}{e}+x^{r}\right)}{der} & \text{otherwise}\end{cases} & \text{otherwise}\end{cases}\right)}{dr} \\
&-\frac{be\left(\begin{cases}\frac{x^{r}}{d^{2}} & \text{for}\: e=0\\-\frac{1}{de+e^{2}x^{r}} & \text{otherwise}\end{cases}\right)\log\left(cx^{n}\right)}{dr} \\
&+\frac{ben\left(\begin{cases}\frac{\begin{cases}\frac{x^{r}}{r} & \text{for}\: r\neq 0\\\log\left(x\right) & \text{otherwise}\end{cases}}{d} & \text{for}\: e=0\\\frac{\begin{cases}-\frac{\operatorname{Li}_{2}\left(\frac{ex^{r}e^{i\pi}}{d}\right)}{r} & \text{for}\: \frac{1}{|x|}<1\wedge |x|<1\\\log\left(d\right)\log\left(x\right)-\frac{\operatorname{Li}_{2}\left(\frac{ex^{r}e^{i\pi}}{d}\right)}{r} & \text{for}\: |x|<1\\-\log\left(d\right)\log\left(\frac{1}{x}\right)-\frac{\operatorname{Li}_{2}\left(\frac{ex^{r}e^{i\pi}}{d}\right)}{r} & \text{for}\: \frac{1}{|x|}<1\\-G_{2,2}^{2,0}\left(\begin{matrix} & 1,1\\0,0 & \end{matrix}\middle| x\right)\log\left(d\right)+G_{2,2}^{0,2}\left(\begin{matrix}1,1 & \\ & 0,0\end{matrix}\middle| x\right)\log\left(d\right)-\frac{\operatorname{Li}_{2}\left(\frac{ex^{r}e^{i\pi}}{d}\right)}{r} & \text{otherwise}\end{cases}}{e} & \text{otherwise}\end{cases}\right)}{d^{2}r} \\
&-\frac{be\left(\begin{cases}\frac{x^{r}}{d} & \text{for}\: e=0\\\frac{\log\left(d+ex^{r}\right)}{e} & \text{otherwise}\end{cases}\right)\log\left(cx^{n}\right)}{d^{2}r} \\
&+\frac{bn\left(\begin{cases}0 & \text{for}\: r=0\\-\frac{\log\left(x^{r}\right)^{2}}{2r} & \text{otherwise}\end{cases}\right)}{d^{2}r}+\frac{b\log\left(x^{r}\right)\log\left(cx^{n}\right)}{d^{2}r}
\end{aligned}
$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**2,x)
```

output
```
-a*e*Piecewise((x**r/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**r), True))/(d*r)
- a*e*Piecewise((x**r/d, Eq(e, 0)), (log(d + e*x**r)/e, True))/(d**2*r) +
a*log(x**r)/(d**2*r) + b*e*n*Piecewise((Piecewise((x**r/r, Ne(r, 0)), (log
(x), True))/d**2, Eq(e, 0)), (-Piecewise((log(x)/e**2, Eq(d, 0) & Eq(r, 0)
), (-1/(e**2*r*x**r), Eq(d, 0)), (log(x)/(d*e + e**2), Eq(r, 0)), (log(x)/
(d*e) - log(d/e + x**r)/(d*e*r), True)), True))/(d*r) - b*e*Piecewise((x**
r/d**2, Eq(e, 0)), (-1/(d*e + e**2*x**r), True))*log(c*x**n)/(d*r) + b*e*n
*Piecewise((Piecewise((x**r/r, Ne(r, 0)), (log(x), True))/d, Eq(e, 0)), (P
iecewise((-polylog(2, e*x**r*exp_polar(I*pi)/d)/r, (Abs(x) < 1) & (1/Abs(x
) < 1)), (log(d)*log(x) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, Abs(x) <
 1), (-log(d)*log(1/x) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, 1/Abs(x)
< 1), (-meijerg(((), (1, 1)), ((0, 0), ()), x)*log(d) + meijerg(((1, 1), (
)), ((), (0, 0)), x)*log(d) - polylog(2, e*x**r*exp_polar(I*pi)/d)/r, True
))/e, True))/(d**2*r) - b*e*Piecewise((x**r/d, Eq(e, 0)), (log(d + e*x**r)
/e, True))*log(c*x**n)/(d**2*r) + b*n*Piecewise((0, Eq(r, 0)), (-log(x**r)
**2/(2*r), True))/(d**2*r) + b*log(x**r)*log(c*x**n)/(d**2*r)
```

3.425.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx=\int \frac{b\log(cx^n)+a}{(ex^r+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
a*(1/(d*e*r*x^r + d^2*r) + log(x)/d^2 - log((e*x^r + d)/e)/(d^2*r)) + b*in
tegrate((log(c) + log(x^n))/(e^2*x*x^(2*r) + 2*d*e*x*x^r + d^2*x), x)
```

3.425.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx=\int \frac{b\log(cx^n)+a}{(ex^r+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^2*x), x)
```

3.425.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^2}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x^r)^2}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^2),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^2), x)
```

3.426 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx$

3.426.1 Optimal result

Integrand size = 23, antiderivative size = 169

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx = -\frac{bn}{2d^2r^2(d+ex^r)} - \frac{bn\log(x)}{2d^3r} + \frac{a+b\log(cx^n)}{2dr(d+ex^r)^2} - \frac{ex^r(a+b\log(cx^n))}{d^3r(d+ex^r)} - \frac{(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^3r} + \frac{3bn\log(d+ex^r)}{2d^3r^2} + \frac{bn\,\mathrm{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^3r^2}$$

output
```
-1/2*b*n/d^2/r^2/(d+e*x^r)-1/2*b*n*ln(x)/d^3/r+1/2*(a+b*ln(c*x^n))/d/r/(d+
e*x^r)^2-e*x^r*(a+b*ln(c*x^n))/d^3/r/(d+e*x^r)-(a+b*ln(c*x^n))*ln(1+d/e/(x
^r))/d^3/r+3/2*b*n*ln(d+e*x^r)/d^3/r^2+b*n*polylog(2,-d/e/(x^r))/d^3/r^2
```

3.426.2 Mathematica [A] (warning: unable to verify)

Time = 0.16 (sec) , antiderivative size = 170, normalized size of antiderivative = 1.01

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx = \frac{\frac{d^2r(a+b\log(cx^n))}{(d+ex^r)^2} + \frac{d(-bn+2ar+2br\log(cx^n))}{d+ex^r} + 3bn\log(d-dx^r) - 2ar\log(d-dx^r) + 2br(n\log(x)-\log(cx^n))\ldots}{2d^3r^2}$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^3),x]
```

output
```
((d^2*r*(a + b*Log[c*x^n]))/(d + e*x^r)^2 + (d*(-(b*n) + 2*a*r + 2*b*r*Log
[c*x^n]))/(d + e*x^r) + 3*b*n*Log[d - d*x^r] - 2*a*r*Log[d - d*x^r] + 2*b*
r*(n*Log[x] - Log[c*x^n])*Log[d - d*x^r] + 2*b*n*((r^2*Log[x]^2)/2 + (-(r*
Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/d]))/
(2*d^3*r^2)
```

3.426.3 Rubi [A] (verified)

Time = 0.97 (sec) , antiderivative size = 204, normalized size of antiderivative = 1.21, number of steps used = 11, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.435$, Rules used = {2791, 2776, 798, 54, 2009, 2791, 2773, 792, 2779, 2838}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}dx$$

$$\Big\downarrow \text{2791}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)^2}dx}{d}-\frac{e\int \frac{x^{r-1}(a+b\log(cx^n))}{(ex^r+d)^3}dx}{d}$$

$$\Big\downarrow \text{2776}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{1}{x(ex^r+d)^2}dx}{2er}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \text{798}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)^2}dx}{d}-\frac{e\left(\frac{bn\int \frac{x^{-r}}{(ex^r+d)^2}dx^r}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \text{54}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)^2}dx}{d}-\frac{e\left(\frac{bn\int \left(\frac{x^{-r}}{d^2}-\frac{e}{d^2(ex^r+d)}-\frac{e}{d(ex^r+d)^2}\right)dx^r}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \text{2009}$$

$$\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)^2}dx}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^r)}{d^2}+\frac{\log(x^r)}{d^2}+\frac{1}{d(d+ex^r)}\right)}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$\Big\downarrow$ 2791

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\int \frac{x^{r-1}(a+b\log(cx^n))}{(ex^r+d)^2}dx}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^r)}{d^2}+\frac{\log(x^r)}{d^2}+\frac{1}{d(d+ex^r)}\right)}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$\Big\downarrow$ 2773

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\int \frac{x^{r-1}}{ex^r+d}dx}{dr}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^r)}{d^2}+\frac{\log(x^r)}{d^2}+\frac{1}{d(d+ex^r)}\right)}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$\Big\downarrow$ 792

$$\frac{\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^r)}{d^2}+\frac{\log(x^r)}{d^2}+\frac{1}{d(d+ex^r)}\right)}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$\Big\downarrow$ 2779

$$\frac{\frac{\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^r)}{d^2}+\frac{\log(x^r)}{d^2}+\frac{1}{d(d+ex^r)}\right)}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

$\Big\downarrow$ 2838

$$\frac{\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(-\frac{\log(d+ex^r)}{d^2}+\frac{\log(x^r)}{d^2}+\frac{1}{d(d+ex^r)}\right)}{2er^2}-\frac{a+b\log(cx^n)}{2er(d+ex^r)^2}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^3),x]
```

3.426. $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx$

output
```
-((e*(-1/2*(a + b*Log[c*x^n])/(e*r*(d + e*x^r)^2) + (b*n*(1/(d*(d + e*x^r)
) + Log[x^r]/d^2 - Log[d + e*x^r]/d^2))/(2*e*r^2)))/d) + (-((e*((x^r*(a +
b*Log[c*x^n]))/(d*r*(d + e*x^r)) - (b*n*Log[d + e*x^r])/(d*e*r^2)))/d) + (
-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*PolyLog[2, -(d/(e*
x^r))])/(d*r^2))/d)/d
```

3.426.3.1 Defintions of rubi rules used

rule 54
```
Int[((a_) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int[E
xpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d}, x] &&
 ILtQ[m, 0] && IntegerQ[n] &&  !(IGtQ[n, 0] && LtQ[m + n + 2, 0])
```

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 798
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[1/n   Subst
[Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a,
b, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.426.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 4.00 (sec) , antiderivative size = 473, normalized size of antiderivative = 2.80

method	result
risch	$\frac{b\ln(d+e\,x^r)n\ln(x)}{r\,d^3}-\frac{b\ln(d+e\,x^r)\ln(x^n)}{r\,d^3}-\frac{bn\ln(x)}{r\,d^2(d+e\,x^r)}+\frac{b\ln(x^n)}{r\,d^2(d+e\,x^r)}-\frac{bn\ln(x)}{2rd(d+e\,x^r)^2}+\frac{b\ln(x^n)}{2rd(d+e\,x^r)^2}-\frac{b\ln(x^r)n\ln(}{r\,d^3}$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^3,x,method=_RETURNVERBOSE)
```

output
```
b/r/d^3*ln(d+e*x^r)*n*ln(x)-b/r/d^3*ln(d+e*x^r)*ln(x^n)-b/r/d^2/(d+e*x^r)*
n*ln(x)+b/r/d^2/(d+e*x^r)*ln(x^n)-1/2*b/r/d/(d+e*x^r)^2*n*ln(x)+1/2*b/r/d/
(d+e*x^r)^2*ln(x^n)-b/r/d^3*ln(x^r)*n*ln(x)+b/r/d^3*ln(x^r)*ln(x^n)+3/2*b*
n*ln(d+e*x^r)/d^3/r^2-b/r*n*e/d^3*ln(x)*x^r/(d+e*x^r)-b/r^2*n/d^3*dilog((d
+e*x^r)/d)-b/r*n/d^3*ln(x)*ln((d+e*x^r)/d)-1/2*b*n/d^2/r^2/(d+e*x^r)-1/2*b
/r*n*e^2/d^3*ln(x)*(x^r)^2/(d+e*x^r)^2-b/r*n*e/d^2*ln(x)*x^r/(d+e*x^r)^2+1
/2*b*n/d^3*ln(x)^2+(-1/2*I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+1/2*I*
b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+1/2*I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-1/2*
I*b*Pi*csgn(I*c*x^n)^3+b*ln(c)+a)/r*(-1/d^3*ln(d+e*x^r)+1/d^2/(d+e*x^r)+1/
2/d/(d+e*x^r)^2+1/d^3*ln(x^r))
```

3.426.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 401 vs. $2(160) = 320$.

Time = 0.28 (sec) , antiderivative size = 401, normalized size of antiderivative = 2.37

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx$$
$$= \frac{bd^2nr^2\log(x)^2 + 3\,bd^2r\log(c) - bd^2n + 3\,ad^2r + \left(be^2nr^2\log(x)^2 + (2\,be^2r^2\log(c) - 3\,be^2nr + 2\,ae^2r^2)\log\right.}{}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^3,x, algorithm="fricas")
```

output
```
1/2*(b*d^2*n*r^2*log(x)^2 + 3*b*d^2*r*log(c) - b*d^2*n + 3*a*d^2*r + (b*e^
2*n*r^2*log(x)^2 + (2*b*e^2*r^2*log(c) - 3*b*e^2*n*r + 2*a*e^2*r^2)*log(x)
)*x^(2*r) + (2*b*d*e*n*r^2*log(x)^2 + 2*b*d*e*r*log(c) - b*d*e*n + 2*a*d*e
*r + 4*(b*d*e*r^2*log(c) - b*d*e*n*r + a*d*e*r^2)*log(x))*x^r - 2*(b*e^2*n
*x^(2*r) + 2*b*d*e*n*x^r + b*d^2*n)*dilog(-(e*x^r + d)/d + 1) - (2*b*d^2*r
*log(c) - 3*b*d^2*n + 2*a*d^2*r + (2*b*e^2*r*log(c) - 3*b*e^2*n + 2*a*e^2*
r)*x^(2*r) + 2*(2*b*d*e*r*log(c) - 3*b*d*e*n + 2*a*d*e*r)*x^r)*log(e*x^r +
 d) + 2*(b*d^2*r^2*log(c) + a*d^2*r^2)*log(x) - 2*(b*e^2*n*r*x^(2*r)*log(x
) + 2*b*d*e*n*r*x^r*log(x) + b*d^2*n*r*log(x))*log((e*x^r + d)/d))/(d^3*e^
2*r^2*x^(2*r) + 2*d^4*e*r^2*x^r + d^5*r^2)
```

3.426.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^3}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**3,x)
```

output
```
Timed out
```

3.426.7 Maxima [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)^{3}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex^{r}+d\right)^{3}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^3,x, algorithm="maxima")
```

output
```
1/2*a*((2*e*x^r + 3*d)/(d^2*e^2*r*x^(2*r) + 2*d^3*e*r*x^r + d^4*r) + 2*log
(x)/d^3 - 2*log((e*x^r + d)/e)/(d^3*r)) + b*integrate((log(c) + log(x^n))/
(e^3*x*x^(3*r) + 3*d*e^2*x*x^(2*r) + 3*d^2*e*x*x^r + d^3*x), x)
```

3.426.8 Giac [F]

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)^{3}}\,dx=\int \frac{b\log\left(cx^{n}\right)+a}{\left(ex^{r}+d\right)^{3}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^3*x), x)
```

3.426.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)^{3}}\,dx=\int \frac{a+b\,\ln\left(c\,x^{n}\right)}{x\,\left(d+e\,x^{r}\right)^{3}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^3),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^3), x)
```

3.427 $\int \frac{(d+ex^r)^3(a+b\log(cx^n))^2}{x}\,dx$

3.427.1 Optimal result

Integrand size = 25, antiderivative size = 245

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))^2}{x}\,dx = \frac{6b^2d^2en^2x^r}{r^3}+\frac{3b^2de^2n^2x^{2r}}{4r^3}+\frac{2b^2e^3n^2x^{3r}}{27r^3} - \frac{6bd^2enx^r(a+b\log(cx^n))}{r^2} - \frac{3bde^2nx^{2r}(a+b\log(cx^n))}{2r^2} - \frac{2be^3nx^{3r}(a+b\log(cx^n))}{9r^2} + \frac{3d^2ex^r(a+b\log(cx^n))^2}{r}+\frac{3de^2x^{2r}(a+b\log(cx^n))^2}{2r} + \frac{e^3x^{3r}(a+b\log(cx^n))^2}{3r}+\frac{d^3(a+b\log(cx^n))^3}{3bn}$$

output
```
6*b^2*d^2*e*n^2*x^r/r^3+3/4*b^2*d*e^2*n^2*x^(2*r)/r^3+2/27*b^2*e^3*n^2*x^(
3*r)/r^3-6*b*d^2*e*n*x^r*(a+b*ln(c*x^n))/r^2-3/2*b*d*e^2*n*x^(2*r)*(a+b*ln
(c*x^n))/r^2-2/9*b*e^3*n*x^(3*r)*(a+b*ln(c*x^n))/r^2+3*d^2*e*x^r*(a+b*ln(c
*x^n))^2/r+3/2*d*e^2*x^(2*r)*(a+b*ln(c*x^n))^2/r+1/3*e^3*x^(3*r)*(a+b*ln(c
*x^n))^2/r+1/3*d^3*(a+b*ln(c*x^n))^3/b/n
```

3.427.2 Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 262, normalized size of antiderivative = 1.07

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx$$
$$= \frac{enx^r(18a^2r^2(18d^2+9dex^r+2e^2x^{2r})-6abnr(108d^2+27dex^r+4e^2x^{2r})+b^2n^2(648d^2+81dex^r+8e^2x^{2r}}{}$$

input
```
Integrate[((d + e*x^r)^3*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(e*n*x^r*(18*a^2*r^2*(18*d^2 + 9*d*e*x^r + 2*e^2*x^(2*r)) - 6*a*b*n*r*(108
*d^2 + 27*d*e*x^r + 4*e^2*x^(2*r)) + b^2*n^2*(648*d^2 + 81*d*e*x^r + 8*e^2
*x^(2*r))) + 108*a^2*d^3*n*r^3*Log[x] - 6*b*e*n*r*x^r*(-6*a*r*(18*d^2 + 9*
d*e*x^r + 2*e^2*x^(2*r)) + b*n*(108*d^2 + 27*d*e*x^r + 4*e^2*x^(2*r)))*Log
[c*x^n] + 18*b*r^2*(6*a*d^3*r + b*e*n*x^r*(18*d^2 + 9*d*e*x^r + 2*e^2*x^(2
*r)))*Log[c*x^n]^2 + 36*b^2*d^3*r^3*Log[c*x^n]^3)/(108*n*r^3)
```

3.427.3 Rubi [A] (verified)

Time = 0.53 (sec) , antiderivative size = 245, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx$$
$$\Big\downarrow \; 2795$$
$$\int \left(\frac{d^3(a+b\log(cx^n))^2}{x}+3d^2ex^{r-1}(a+b\log(cx^n))^2+3de^2x^{2r-1}(a+b\log(cx^n))^2+e^3x^{3r-1}(a+b\log(cx^n))^2\right)$$
$$\Big\downarrow \; 2009$$
$$\frac{d^3(a+b\log(cx^n))^3}{3bn}-\frac{6bd^2enx^r(a+b\log(cx^n))}{r^2}+\frac{3d^2ex^r(a+b\log(cx^n))^2}{r}-\frac{3bde^2nx^{2r}(a+b\log(cx^n))}{2r^2}+\frac{3de^2x^{2r}(a+b\log(cx^n))^2}{2r}-\frac{2be^3nx^{3r}(a+b\log(cx^n))}{9r^2}+\frac{e^3x^{3r}(a+b\log(cx^n))^2}{3r}+\frac{6b^2d^2en^2x^r}{r^3}+\frac{3b^2de^2n^2x^{2r}}{4r^3}+\frac{2b^2e^3n^2x^{3r}}{27r^3}$$

input
```
Int[((d + e*x^r)^3*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(6*b^2*d^2*e*n^2*x^r)/r^3 + (3*b^2*d*e^2*n^2*x^(2*r))/(4*r^3) + (2*b^2*e^3
*n^2*x^(3*r))/(27*r^3) - (6*b*d^2*e*n*x^r*(a + b*Log[c*x^n]))/r^2 - (3*b*d
*e^2*n*x^(2*r)*(a + b*Log[c*x^n]))/(2*r^2) - (2*b*e^3*n*x^(3*r)*(a + b*Log
[c*x^n]))/(9*r^2) + (3*d^2*e*x^r*(a + b*Log[c*x^n])^2)/r + (3*d*e^2*x^(2*r
)*(a + b*Log[c*x^n])^2)/(2*r) + (e^3*x^(3*r)*(a + b*Log[c*x^n])^2)/(3*r) +
 (d^3*(a + b*Log[c*x^n])^3)/(3*b*n)
```

3.427.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.427.4 Maple [A] (verified)

Time = 9.88 (sec) , antiderivative size = 418, normalized size of antiderivative = 1.71

method	result
parallelrisch	$\frac{36b^2e^3\ln(c\,x^n)^2x^{3r}r^2n+72x^{3r}\ln(c\,x^n)ab\,e^3n\,r^2-24x^{3r}\ln(c\,x^n)b^2e^3n^2r+162b^2d\,e^2\ln(c\,x^n)^2x^{2r}r^2n+36x^{3r}a^2e^3n\,r^2-24x^{3r}a}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^3*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

output
```
1/108*(36*b^2*e^3*ln(c*x^n)^2*(x^r)^3*r^2*n+72*(x^r)^3*ln(c*x^n)*a*b*e^3*n
*r^2-24*(x^r)^3*ln(c*x^n)*b^2*e^3*n^2*r+162*b^2*d*e^2*ln(c*x^n)^2*(x^r)^2*
r^2*n+36*(x^r)^3*a^2*e^3*n*r^2-24*(x^r)^3*a*b*e^3*n^2*r+8*(x^r)^3*b^2*e^3*
n^3+324*(x^r)^2*ln(c*x^n)*a*b*d*e^2*n*r^2-162*(x^r)^2*ln(c*x^n)*b^2*d*e^2*
n^2*r+324*b^2*d^2*e*ln(c*x^n)^2*x^r*r^2*n+36*b^2*d^3*ln(c*x^n)^3*r^3+108*l
n(x)*a^2*d^3*n*r^3+162*(x^r)^2*a^2*d*e^2*n*r^2-162*(x^r)^2*a*b*d*e^2*n^2*r
+81*(x^r)^2*b^2*d*e^2*n^3+648*x^r*ln(c*x^n)*a*b*d^2*e*n*r^2-648*x^r*ln(c*x
^n)*b^2*d^2*e*n^2*r+108*d^3*a*b*ln(c*x^n)^2*r^3+324*x^r*a^2*d^2*e*n*r^2-64
8*x^r*a*b*d^2*e*n^2*r+648*x^r*b^2*d^2*e*n^3)/r^3/n
```

3.427.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 521 vs. $2(231) = 462$.

Time = 0.27 (sec) , antiderivative size = 521, normalized size of antiderivative = 2.13

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx$$
$$= \frac{36\,b^2d^3n^2r^3\log(x)^3 + 108\,(b^2d^3nr^3\log(c) + abd^3nr^3)\log(x)^2 + 4\,(9\,b^2e^3n^2r^2\log(x)^2 + 9\,b^2e^3r^2\log(c)^2 + \ldots}{}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

output
```
1/108*(36*b^2*d^3*n^2*r^3*log(x)^3 + 108*(b^2*d^3*n*r^3*log(c) + a*b*d^3*n
*r^3)*log(x)^2 + 4*(9*b^2*e^3*n^2*r^2*log(x)^2 + 9*b^2*e^3*r^2*log(c)^2 +
2*b^2*e^3*n^2 - 6*a*b*e^3*n*r + 9*a^2*e^3*r^2 - 6*(b^2*e^3*n*r - 3*a*b*e^3
*r^2)*log(c) + 6*(3*b^2*e^3*n*r^2*log(c) - b^2*e^3*n^2*r + 3*a*b*e^3*n*r^2
)*log(x))*x^(3*r) + 81*(2*b^2*d*e^2*n^2*r^2*log(x)^2 + 2*b^2*d*e^2*r^2*log
(c)^2 + b^2*d*e^2*n^2 - 2*a*b*d*e^2*n*r + 2*a^2*d*e^2*r^2 - 2*(b^2*d*e^2*n
*r - 2*a*b*d*e^2*r^2)*log(c) + 2*(2*b^2*d*e^2*n*r^2*log(c) - b^2*d*e^2*n^2
*r + 2*a*b*d*e^2*n*r^2)*log(x))*x^(2*r) + 324*(b^2*d^2*e*n^2*r^2*log(x)^2
+ b^2*d^2*e*r^2*log(c)^2 + 2*b^2*d^2*e*n^2 - 2*a*b*d^2*e*n*r + a^2*d^2*e*r
^2 - 2*(b^2*d^2*e*n*r - a*b*d^2*e*r^2)*log(c) + 2*(b^2*d^2*e*n*r^2*log(c)
- b^2*d^2*e*n^2*r + a*b*d^2*e*n*r^2)*log(x))*x^r + 108*(b^2*d^3*r^3*log(c)
^2 + 2*a*b*d^3*r^3*log(c) + a^2*d^3*r^3)*log(x))/r^3
```

3.427.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 588 vs. $2(246) = 492$.

Time = 8.03 (sec) , antiderivative size = 588, normalized size of antiderivative = 2.40

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx$$
$$= \begin{cases} (a+b\log(c))^2 (d+e)^3 \log(x) \\ (a+b\log(c))^2 \left(d^3\log(x) + \frac{3d^2ex^r}{r} + \frac{3de^2x^{2r}}{2r} + \frac{e^3x^{3r}}{3r}\right) \\ (d+e)^3 \left(\begin{cases} \frac{a^2\log(cx^n)+ab\log(cx^n)^2+\frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n \neq 0 \\ (a^2+2ab\log(c)+b^2\log(c)^2)\log(x) & \text{otherwise} \end{cases}\right) \\ \frac{a^2d^3\log(cx^n)}{n} + \frac{3a^2d^2ex^r}{r} + \frac{3a^2de^2x^{2r}}{2r} + \frac{a^2e^3x^{3r}}{3r} + \frac{abd^3\log(cx^n)^2}{n} - \frac{6abd^2enx^r}{r^2} + \frac{6abd^2ex^r\log(cx^n)}{r} - \frac{3abde^2nx^{2r}}{2r^2} + \frac{3abde}{} \end{cases}$$

input
```
integrate((d+e*x**r)**3*(a+b*ln(c*x**n))**2/x,x)
```

output
```
Piecewise(((a + b*log(c))**2*(d + e)**3*log(x), Eq(n, 0) & Eq(r, 0)), ((a
+ b*log(c))**2*(d**3*log(x) + 3*d**2*e*x**r/r + 3*d*e**2*x**(2*r)/(2*r) +
e**3*x**(3*r)/(3*r)), Eq(n, 0)), ((d + e)**3*Piecewise(((a**2*log(c*x**n)
+ a*b*log(c*x**n)**2 + b**2*log(c*x**n)**3/3)/n, Ne(n, 0)), ((a**2 + 2*a*b
*log(c) + b**2*log(c)**2)*log(x), True)), Eq(r, 0)), (a**2*d**3*log(c*x**n
)/n + 3*a**2*d**2*e*x**r/r + 3*a**2*d*e**2*x**(2*r)/(2*r) + a**2*e**3*x**(
3*r)/(3*r) + a*b*d**3*log(c*x**n)**2/n - 6*a*b*d**2*e*n*x**r/r**2 + 6*a*b*
d**2*e*x**r*log(c*x**n)/r - 3*a*b*d*e**2*n*x**(2*r)/(2*r**2) + 3*a*b*d*e**
2*x**(2*r)*log(c*x**n)/r - 2*a*b*e**3*n*x**(3*r)/(9*r**2) + 2*a*b*e**3*x**
(3*r)*log(c*x**n)/(3*r) + b**2*d**3*log(c*x**n)**3/(3*n) + 6*b**2*d**2*e*n
**2*x**r/r**3 - 6*b**2*d**2*e*n*x**r*log(c*x**n)/r**2 + 3*b**2*d**2*e*x**r
*log(c*x**n)**2/r + 3*b**2*d*e**2*n**2*x**(2*r)/(4*r**3) - 3*b**2*d*e**2*n
*x**(2*r)*log(c*x**n)/(2*r**2) + 3*b**2*d*e**2*x**(2*r)*log(c*x**n)**2/(2*
r) + 2*b**2*e**3*n**2*x**(3*r)/(27*r**3) - 2*b**2*e**3*n*x**(3*r)*log(c*x*
*n)/(9*r**2) + b**2*e**3*x**(3*r)*log(c*x**n)**2/(3*r), True))
```

3.427.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 391, normalized size of antiderivative = 1.60

$$\int \frac{(d+ex^r)^3(a+b\log(cx^n))^2}{x}\,dx = \frac{b^2e^3x^{3\,r}\log(cx^n)^2}{3\,r} + \frac{3\,b^2de^2x^{2\,r}\log(cx^n)^2}{2\,r} + \frac{3\,b^2d^2ex^r\log(cx^n)^2}{r} + \frac{b^2d^3\log(cx^n)^3}{3\,n} - \frac{2}{27}\,b^2e^3\left(\frac{3\,nx^{3\,r}\log(cx^n)}{r^2} - \frac{n^2x^{3\,r}}{r^3}\right) - \frac{3}{4}\,b^2de^2\left(\frac{2\,nx^{2\,r}\log(cx^n)}{r^2} - \frac{n^2x^{2\,r}}{r^3}\right) - 6\,b^2d^2e\left(\frac{nx^r\log(cx^n)}{r^2} - \frac{n^2x^r}{r^3}\right) + \frac{2\,abe^3x^{3\,r}\log(cx^n)}{3\,r} + \frac{3\,abde^2x^{2\,r}\log(cx^n)}{r} + \frac{6\,abd^2ex^r\log(cx^n)}{r} + \frac{abd^3\log(cx^n)^2}{n} + a^2d^3\log(x) - \frac{2\,abe^3nx^{3\,r}}{9\,r^2} + \frac{a^2e^3x^{3\,r}}{3\,r} - \frac{3\,abde^2nx^{2\,r}}{2\,r^2} + \frac{3\,a^2de^2x^{2\,r}}{2\,r} - \frac{6\,abd^2enx^r}{r^2} + \frac{3\,a^2d^2ex^r}{r}$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

output
```
1/3*b^2*e^3*x^(3*r)*log(c*x^n)^2/r + 3/2*b^2*d*e^2*x^(2*r)*log(c*x^n)^2/r
+ 3*b^2*d^2*e*x^r*log(c*x^n)^2/r + 1/3*b^2*d^3*log(c*x^n)^3/n - 2/27*b^2*e
^3*(3*n*x^(3*r)*log(c*x^n)/r^2 - n^2*x^(3*r)/r^3) - 3/4*b^2*d*e^2*(2*n*x^(
2*r)*log(c*x^n)/r^2 - n^2*x^(2*r)/r^3) - 6*b^2*d^2*e*(n*x^r*log(c*x^n)/r^2
 - n^2*x^r/r^3) + 2/3*a*b*e^3*x^(3*r)*log(c*x^n)/r + 3*a*b*d*e^2*x^(2*r)*l
og(c*x^n)/r + 6*a*b*d^2*e*x^r*log(c*x^n)/r + a*b*d^3*log(c*x^n)^2/n + a^2*
d^3*log(x) - 2/9*a*b*e^3*n*x^(3*r)/r^2 + 1/3*a^2*e^3*x^(3*r)/r - 3/2*a*b*d
*e^2*n*x^(2*r)/r^2 + 3/2*a^2*d*e^2*x^(2*r)/r - 6*a*b*d^2*e*n*x^r/r^2 + 3*a
^2*d^2*e*x^r/r
```

3.427.8 Giac [F]

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx = \int \frac{(ex^r+d)^3(b\log(cx^n)+a)^2}{x}\,dx$$

input
```
integrate((d+e*x^r)^3*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(b*log(c*x^n) + a)^2/x, x)
```

3.427.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^3 (a+b\log(cx^n))^2}{x}\,dx = \int \frac{(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))^2}{x}\,dx$$

input
```
int(((d + e*x^r)^3*(a + b*log(c*x^n))^2)/x,x)
```

output
```
int(((d + e*x^r)^3*(a + b*log(c*x^n))^2)/x, x)
```

3.428 $\int \frac{(d+ex^r)^2(a+b\log(cx^n))^2}{x}\,dx$

3.428.1 Optimal result

Integrand size = 25, antiderivative size = 161

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))^2}{x}\,dx = \frac{4b^2den^2x^r}{r^3} + \frac{b^2e^2n^2x^{2r}}{4r^3} - \frac{4bdenx^r(a+b\log(cx^n))}{r^2} - \frac{be^2nx^{2r}(a+b\log(cx^n))}{2r^2} + \frac{2dex^r(a+b\log(cx^n))^2}{r} + \frac{e^2x^{2r}(a+b\log(cx^n))^2}{2r} + \frac{d^2(a+b\log(cx^n))^3}{3bn}$$

output
```
4*b^2*d*e*n^2*x^r/r^3+1/4*b^2*e^2*n^2*x^(2*r)/r^3-4*b*d*e*n*x^r*(a+b*ln(c*
x^n))/r^2-1/2*b*e^2*n*x^(2*r)*(a+b*ln(c*x^n))/r^2+2*d*e*x^r*(a+b*ln(c*x^n)
)^2/r+1/2*e^2*x^(2*r)*(a+b*ln(c*x^n))^2/r+1/3*d^2*(a+b*ln(c*x^n))^3/b/n
```

3.428.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 179, normalized size of antiderivative = 1.11

$$\int \frac{(d+ex^r)^2(a+b\log(cx^n))^2}{x}\,dx = \frac{3enx^r(2a^2r^2(4d+ex^r) - 2abnr(8d+ex^r) + b^2n^2(16d+ex^r)) + 12a^2d^2nr^3\log(x) - 6benrx^r(-2ar(4d+}{12nr^3}$$

input
```
Integrate[((d + e*x^r)^2*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(3*e*n*x^r*(2*a^2*r^2*(4*d + e*x^r) - 2*a*b*n*r*(8*d + e*x^r) + b^2*n^2*(1
6*d + e*x^r)) + 12*a^2*d^2*n*r^3*Log[x] - 6*b*e*n*r*x^r*(-2*a*r*(4*d + e*x
^r) + b*n*(8*d + e*x^r))*Log[c*x^n] + 6*b*r^2*(2*a*d^2*r + b*e*n*x^r*(4*d
+ e*x^r))*Log[c*x^n]^2 + 4*b^2*d^2*r^3*Log[c*x^n]^3)/(12*n*r^3)
```

3.428.3 Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 161, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))^2}{x} dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(\frac{d^2(a+b\log(cx^n))^2}{x}+2dex^{r-1}(a+b\log(cx^n))^2+e^2x^{2r-1}(a+b\log(cx^n))^2\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2(a+b\log(cx^n))^3}{3bn}-\frac{4bdenx^r(a+b\log(cx^n))}{r^2}+\frac{2dex^r(a+b\log(cx^n))^2}{r}-\frac{be^2nx^{2r}(a+b\log(cx^n))}{2r^2}+\frac{e^2x^{2r}(a+b\log(cx^n))^2}{2r}+\frac{4b^2den^2x^r}{r^3}+\frac{b^2e^2n^2x^{2r}}{4r^3}$$

input
```
Int[((d + e*x^r)^2*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(4*b^2*d*e*n^2*x^r)/r^3 + (b^2*e^2*n^2*x^(2*r))/(4*r^3) - (4*b*d*e*n*x^r*(
a + b*Log[c*x^n]))/r^2 - (b*e^2*n*x^(2*r)*(a + b*Log[c*x^n]))/(2*r^2) + (2
*d*e*x^r*(a + b*Log[c*x^n])^2)/r + (e^2*x^(2*r)*(a + b*Log[c*x^n])^2)/(2*r
) + (d^2*(a + b*Log[c*x^n])^3)/(3*b*n)
```

3.428.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.428.4 Maple [A] (verified)

Time = 3.38 (sec) , antiderivative size = 281, normalized size of antiderivative = 1.75

method	result
parallelrisch	$\frac{6e^2b^2\ln(c\,x^n)^2x^{2r}r^2n+12x^{2r}\ln(c\,x^n)ab\,e^2n\,r^2-6x^{2r}\ln(c\,x^n)b^2e^2n^2r+24b^2de\ln(c\,x^n)^2x^rr^2n+4b^2d^2\ln(c\,x^n)^3r^3+12\ln(x)a^2}{}$
risch	Expression too large to display

input
```
int((d+e*x^r)^2*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

output
```
1/12*(6*e^2*b^2*ln(c*x^n)^2*(x^r)^2*r^2*n+12*(x^r)^2*ln(c*x^n)*a*b*e^2*n*r
^2-6*(x^r)^2*ln(c*x^n)*b^2*e^2*n^2*r+24*b^2*d*e*ln(c*x^n)^2*x^r*r^2*n+4*b^
2*d^2*ln(c*x^n)^3*r^3+12*ln(x)*a^2*d^2*n*r^3+6*(x^r)^2*a^2*e^2*n*r^2-6*(x^
r)^2*a*b*e^2*n^2*r+3*(x^r)^2*b^2*e^2*n^3+48*x^r*ln(c*x^n)*a*b*d*e*n*r^2-48
*x^r*ln(c*x^n)*b^2*d*e*n^2*r+12*a*b*d^2*ln(c*x^n)^2*r^3+24*x^r*a^2*d*e*n*r
^2-48*x^r*a*b*d*e*n^2*r+48*x^r*b^2*d*e*n^3)/r^3/n
```

3.428.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 353 vs. $2(153) = 306$.

Time = 0.27 (sec) , antiderivative size = 353, normalized size of antiderivative = 2.19

$$\int \frac{(d+ex^r)^2\,(a+b\log(cx^n))^2}{x}\,dx$$
$$= \frac{4\,b^2d^2n^2r^3\log(x)^3+12\,(b^2d^2nr^3\log(c)+abd^2nr^3)\log(x)^2+3\,\big(2\,b^2e^2n^2r^2\log(x)^2+2\,b^2e^2r^2\log(c)^2+b^2}{}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

output
```
1/12*(4*b^2*d^2*n^2*r^3*log(x)^3 + 12*(b^2*d^2*n*r^3*log(c) + a*b*d^2*n*r^
3)*log(x)^2 + 3*(2*b^2*e^2*n^2*r^2*log(x)^2 + 2*b^2*e^2*r^2*log(c)^2 + b^2
*e^2*n^2 - 2*a*b*e^2*n*r + 2*a^2*e^2*r^2 - 2*(b^2*e^2*n*r - 2*a*b*e^2*r^2)
*log(c) + 2*(2*b^2*e^2*n*r^2*log(c) - b^2*e^2*n^2*r + 2*a*b*e^2*n*r^2)*log
(x))*x^(2*r) + 24*(b^2*d*e*n^2*r^2*log(x)^2 + b^2*d*e*r^2*log(c)^2 + 2*b^2
*d*e*n^2 - 2*a*b*d*e*n*r + a^2*d*e*r^2 - 2*(b^2*d*e*n*r - a*b*d*e*r^2)*log
(c) + 2*(b^2*d*e*n*r^2*log(c) - b^2*d*e*n^2*r + a*b*d*e*n*r^2)*log(x))*x^r
 + 12*(b^2*d^2*r^3*log(c)^2 + 2*a*b*d^2*r^3*log(c) + a^2*d^2*r^3)*log(x))/
r^3
```

3.428.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 408 vs. $2(156) = 312$.

Time = 7.70 (sec) , antiderivative size = 408, normalized size of antiderivative = 2.53

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))^2}{x}\,dx$$
$$= \begin{cases} (a+b\log(c))^2 (d+e)^2 \log(x) \\ (a+b\log(c))^2 \left(d^2\log(x) + \frac{2dex^r}{r} + \frac{e^2x^{2r}}{2r}\right) \\ (d+e)^2 \left(\begin{cases} \frac{a^2\log(cx^n)+ab\log(cx^n)^2+\frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n \neq 0 \\ \left(a^2+2ab\log(c)+b^2\log(c)^2\right)\log(x) & \text{otherwise} \end{cases}\right) \\ \frac{a^2d^2\log(cx^n)}{n} + \frac{2a^2dex^r}{r} + \frac{a^2e^2x^{2r}}{2r} + \frac{abd^2\log(cx^n)^2}{n} - \frac{4abdenx^r}{r^2} + \frac{4abdex^r\log(cx^n)}{r} - \frac{abe^2nx^{2r}}{2r^2} + \frac{abe^2x^{2r}\log(cx^n)}{r} + \frac{b^2d^2}{} \end{cases}$$

input
```
integrate((d+e*x**r)**2*(a+b*ln(c*x**n))**2/x,x)
```

output
```
Piecewise(((a + b*log(c))**2*(d + e)**2*log(x), Eq(n, 0) & Eq(r, 0)), ((a
+ b*log(c))**2*(d**2*log(x) + 2*d*e*x**r/r + e**2*x**(2*r)/(2*r)), Eq(n, 0
)), ((d + e)**2*Piecewise(((a**2*log(c*x**n) + a*b*log(c*x**n)**2 + b**2*l
og(c*x**n)**3/3)/n, Ne(n, 0)), ((a**2 + 2*a*b*log(c) + b**2*log(c)**2)*log
(x), True)), Eq(r, 0)), (a**2*d**2*log(c*x**n)/n + 2*a**2*d*e*x**r/r + a**
2*e**2*x**(2*r)/(2*r) + a*b*d**2*log(c*x**n)**2/n - 4*a*b*d*e*n*x**r/r**2
+ 4*a*b*d*e*x**r*log(c*x**n)/r - a*b*e**2*n*x**(2*r)/(2*r**2) + a*b*e**2*x
**(2*r)*log(c*x**n)/r + b**2*d**2*log(c*x**n)**3/(3*n) + 4*b**2*d*e*n**2*x
**r/r**3 - 4*b**2*d*e*n*x**r*log(c*x**n)/r**2 + 2*b**2*d*e*x**r*log(c*x**n
)**2/r + b**2*e**2*n**2*x**(2*r)/(4*r**3) - b**2*e**2*n*x**(2*r)*log(c*x**
n)/(2*r**2) + b**2*e**2*x**(2*r)*log(c*x**n)**2/(2*r), True))
```

3.428.7 Maxima [A] (verification not implemented)

Time = 0.19 (sec) , antiderivative size = 259, normalized size of antiderivative = 1.61

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))^2}{x}\,dx = \frac{b^2e^2x^{2r}\log(cx^n)^2}{2r} + \frac{2b^2dex^r\log(cx^n)^2}{r} + \frac{b^2d^2\log(cx^n)^3}{3n} - \frac{1}{4}b^2e^2\left(\frac{2nx^{2r}\log(cx^n)}{r^2} - \frac{n^2x^{2r}}{r^3}\right) - 4b^2de\left(\frac{nx^r\log(cx^n)}{r^2} - \frac{n^2x^r}{r^3}\right) + \frac{abe^2x^{2r}\log(cx^n)}{r} + \frac{4abdex^r\log(cx^n)}{r} + \frac{abd^2\log(cx^n)^2}{n} + a^2d^2\log(x) - \frac{abe^2nx^{2r}}{2r^2} + \frac{a^2e^2x^{2r}}{2r} - \frac{4abdenx^r}{r^2} + \frac{2a^2dex^r}{r}$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

output
```
1/2*b^2*e^2*x^(2*r)*log(c*x^n)^2/r + 2*b^2*d*e*x^r*log(c*x^n)^2/r + 1/3*b^
2*d^2*log(c*x^n)^3/n - 1/4*b^2*e^2*(2*n*x^(2*r)*log(c*x^n)/r^2 - n^2*x^(2*
r)/r^3) - 4*b^2*d*e*(n*x^r*log(c*x^n)/r^2 - n^2*x^r/r^3) + a*b*e^2*x^(2*r)
*log(c*x^n)/r + 4*a*b*d*e*x^r*log(c*x^n)/r + a*b*d^2*log(c*x^n)^2/n + a^2*
d^2*log(x) - 1/2*a*b*e^2*n*x^(2*r)/r^2 + 1/2*a^2*e^2*x^(2*r)/r - 4*a*b*d*e
*n*x^r/r^2 + 2*a^2*d*e*x^r/r
```

3.428.8 Giac [F]

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))^2}{x}\,dx = \int \frac{(ex^r+d)^2(b\log(cx^n)+a)^2}{x}\,dx$$

input
```
integrate((d+e*x^r)^2*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(b*log(c*x^n) + a)^2/x, x)
```

3.428.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^2 (a+b\log(cx^n))^2}{x}\,dx = \int \frac{(d+e\,x^r)^2 (a+b\,\ln(c\,x^n))^2}{x}\,dx$$

input
```
int(((d + e*x^r)^2*(a + b*log(c*x^n))^2)/x,x)
```

output
```
int(((d + e*x^r)^2*(a + b*log(c*x^n))^2)/x, x)
```

3.429 $\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x}\,dx$

3.429.1 Optimal result

Integrand size = 23, antiderivative size = 80

$$\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x}\,dx = \frac{2b^2en^2x^r}{r^3} - \frac{2benx^r(a+b\log(cx^n))}{r^2} + \frac{ex^r(a+b\log(cx^n))^2}{r} + \frac{d(a+b\log(cx^n))^3}{3bn}$$

output
```
2*b^2*e*n^2*x^r/r^3-2*b*e*n*x^r*(a+b*ln(c*x^n))/r^2+e*x^r*(a+b*ln(c*x^n))^
2/r+1/3*d*(a+b*ln(c*x^n))^3/b/n
```

3.429.2 Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.36

$$\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x}\,dx = \frac{e(2b^2n^2-2abnr+a^2r^2)x^r}{r^3} + a^2d\log(x) - \frac{2be(bn-ar)x^r\log(cx^n)}{r^2} + \frac{b(adr+benx^r)\log^2(cx^n)}{nr} + \frac{b^2d\log^3(cx^n)}{3n}$$

input
```
Integrate[((d + e*x^r)*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(e*(2*b^2*n^2 - 2*a*b*n*r + a^2*r^2)*x^r)/r^3 + a^2*d*Log[x] - (2*b*e*(b*n
 - a*r)*x^r*Log[c*x^n])/r^2 + (b*(a*d*r + b*e*n*x^r)*Log[c*x^n]^2)/(n*r) +
 (b^2*d*Log[c*x^n]^3)/(3*n)
```

3.429.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 80, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)\,(a+b\log(cx^n))^2}{x}\,dx$$

$$\Big\downarrow \text{ 2795}$$

$$\int \left(\frac{d(a+b\log(cx^n))^2}{x}+ex^{r-1}(a+b\log(cx^n))^2\right)dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{d(a+b\log(cx^n))^3}{3bn}-\frac{2benx^r(a+b\log(cx^n))}{r^2}+\frac{ex^r(a+b\log(cx^n))^2}{r}+\frac{2b^2en^2x^r}{r^3}$$

input
```
Int[((d + e*x^r)*(a + b*Log[c*x^n])^2)/x,x]
```

output
```
(2*b^2*e*n^2*x^r)/r^3 - (2*b*e*n*x^r*(a + b*Log[c*x^n]))/r^2 + (e*x^r*(a +
 b*Log[c*x^n])^2)/r + (d*(a + b*Log[c*x^n])^3)/(3*b*n)
```

3.429.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.429.4 Maple [A] (verified)

Time = 0.83 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.86

method	result
parallelrisch	$\frac{3x^r \ln(c\,x^n)^2 b^2 e\,r^2 n+b^2 d\ln(c\,x^n)^3 r^3+3\ln(x) a^2 dn\,r^3+6x^r \ln(c\,x^n) aben\,r^2-6x^r \ln(c\,x^n) b^2 e\,n^2 r+3abd\ln(c\,x^n)^2 r^3+3x^r a^2 en}{3r^3 n}$
risch	Expression too large to display

input
```
int((d+e*x^r)*(a+b*ln(c*x^n))^2/x,x,method=_RETURNVERBOSE)
```

output
```
1/3*(3*x^r*ln(c*x^n)^2*b^2*e*r^2*n+b^2*d*ln(c*x^n)^3*r^3+3*ln(x)*a^2*d*n*r
^3+6*x^r*ln(c*x^n)*a*b*e*n*r^2-6*x^r*ln(c*x^n)*b^2*e*n^2*r+3*a*b*d*ln(c*x^
n)^2*r^3+3*x^r*a^2*e*n*r^2-6*x^r*a*b*e*n^2*r+6*x^r*b^2*e*n^3)/r^3/n
```

3.429.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 193 vs. 2(78) = 156.

Time = 0.31 (sec) , antiderivative size = 193, normalized size of antiderivative = 2.41

$$\int \frac{(d+ex^r)\,(a+b\log{(cx^n)})^2}{x}\,dx$$
$$= \frac{b^2dn^2r^3\log{(x)}^3 + 3\,(b^2dnr^3\log{(c)} + abdnr^3)\log{(x)}^2 + 3\,\left(b^2en^2r^2\log{(x)}^2 + b^2er^2\log{(c)}^2 + 2\,b^2en^2 - 2\,a\right.}{}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))^2/x,x, algorithm="fricas")
```

output
```
1/3*(b^2*d*n^2*r^3*log(x)^3 + 3*(b^2*d*n*r^3*log(c) + a*b*d*n*r^3)*log(x)^
2 + 3*(b^2*e*n^2*r^2*log(x)^2 + b^2*e*r^2*log(c)^2 + 2*b^2*e*n^2 - 2*a*b*e
*n*r + a^2*e*r^2 - 2*(b^2*e*n*r - a*b*e*r^2)*log(c) + 2*(b^2*e*n*r^2*log(c
) - b^2*e*n^2*r + a*b*e*n*r^2)*log(x))*x^r + 3*(b^2*d*r^3*log(c)^2 + 2*a*b
*d*r^3*log(c) + a^2*d*r^3)*log(x))/r^3
```

3.429.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 245 vs. $2(76) = 152$.

Time = 6.87 (sec) , antiderivative size = 245, normalized size of antiderivative = 3.06

$$\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x}\,dx$$
$$=\begin{cases}(a+b\log(c))^2(d+e)\log(x)\\ (a+b\log(c))^2\left(d\log(x)+\frac{ex^r}{r}\right)\\ (d+e)\left(\begin{cases}\frac{a^2\log(cx^n)+ab\log(cx^n)^2+\frac{b^2\log(cx^n)^3}{3}}{n} & \text{for } n\neq 0\\ (a^2+2ab\log(c)+b^2\log(c)^2)\log(x) & \text{otherwise}\end{cases}\right)\\ \frac{a^2d\log(cx^n)}{n}+\frac{a^2ex^r}{r}+\frac{abd\log(cx^n)^2}{n}-\frac{2abenx^r}{r^2}+\frac{2abex^r\log(cx^n)}{r}+\frac{b^2d\log(cx^n)^3}{3n}+\frac{2b^2en^2x^r}{r^3}-\frac{2b^2enx^r\log(cx^n)}{r^2}+\frac{b^2ex^r}{}\end{cases}$$

input
```
integrate((d+e*x**r)*(a+b*ln(c*x**n))**2/x,x)
```

output
```
Piecewise(((a + b*log(c))**2*(d + e)*log(x), Eq(n, 0) & Eq(r, 0)), ((a + b
*log(c))**2*(d*log(x) + e*x**r/r), Eq(n, 0)), ((d + e)*Piecewise(((a**2*lo
g(c*x**n) + a*b*log(c*x**n)**2 + b**2*log(c*x**n)**3/3)/n, Ne(n, 0)), ((a*
*2 + 2*a*b*log(c) + b**2*log(c)**2)*log(x), True)), Eq(r, 0)), (a**2*d*log
(c*x**n)/n + a**2*e*x**r/r + a*b*d*log(c*x**n)**2/n - 2*a*b*e*n*x**r/r**2
+ 2*a*b*e*x**r*log(c*x**n)/r + b**2*d*log(c*x**n)**3/(3*n) + 2*b**2*e*n**2
*x**r/r**3 - 2*b**2*e*n*x**r*log(c*x**n)/r**2 + b**2*e*x**r*log(c*x**n)**2
/r, True))
```

3.429.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.64

$$\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x}\,dx = \frac{b^2ex^r\log(cx^n)^2}{r}+\frac{b^2d\log(cx^n)^3}{3\,n} - 2\,b^2e\left(\frac{nx^r\log(cx^n)}{r^2}-\frac{n^2x^r}{r^3}\right)+\frac{2\,abex^r\log(cx^n)}{r} + \frac{abd\log(cx^n)^2}{n}+a^2d\log(x)-\frac{2\,abenx^r}{r^2}+\frac{a^2ex^r}{r}$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))^2/x,x, algorithm="maxima")
```

output
```
b^2*e*x^r*log(c*x^n)^2/r + 1/3*b^2*d*log(c*x^n)^3/n - 2*b^2*e*(n*x^r*log(c
*x^n)/r^2 - n^2*x^r/r^3) + 2*a*b*e*x^r*log(c*x^n)/r + a*b*d*log(c*x^n)^2/n
 + a^2*d*log(x) - 2*a*b*e*n*x^r/r^2 + a^2*e*x^r/r
```

3.429.8 Giac [F]

$$\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x}\,dx = \int \frac{(ex^r+d)(b\log(cx^n)+a)^2}{x}\,dx$$

input
```
integrate((d+e*x^r)*(a+b*log(c*x^n))^2/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)*(b*log(c*x^n) + a)^2/x, x)
```

3.429.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)(a+b\log(cx^n))^2}{x}\,dx = \int \frac{(d+e\,x^r)\,(a+b\,\ln(c\,x^n))^2}{x}\,dx$$

input
```
int(((d + e*x^r)*(a + b*log(c*x^n))^2)/x,x)
```

output
```
int(((d + e*x^r)*(a + b*log(c*x^n))^2)/x, x)
```

3.430 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx$

3.430.1 Optimal result

Integrand size = 25, antiderivative size = 94

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx = -\frac{(a+b\log(cx^n))^2\log\left(1+\frac{dx^{-r}}{e}\right)}{dr} + \frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2} + \frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{dr^3}$$

output
```
-(a+b*ln(c*x^n))^2*ln(1+d/e/(x^r))/d/r+2*b*n*(a+b*ln(c*x^n))*polylog(2,-d/
e/(x^r))/d/r^2+2*b^2*n^2*polylog(3,-d/e/(x^r))/d/r^3
```

3.430.2 Mathematica [B] (warning: unable to verify)

Leaf count is larger than twice the leaf count of optimal. 270 vs. $2(94) = 188$.

Time = 0.19 (sec) , antiderivative size = 270, normalized size of antiderivative = 2.87

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx =$$

$$-\frac{a^2r^2\log(d-dx^r) - 2abr^2(n\log(x)-\log(cx^n))\log(d-dx^r) + b^2r^2(-n\log(x)+\log(cx^n))^2\log(d-d}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)),x]
```

output
```
-((a^2*r^2*Log[d - d*x^r] - 2*a*b*r^2*(n*Log[x] - Log[c*x^n])*Log[d - d*x^
r] + b^2*r^2*(-(n*Log[x]) + Log[c*x^n])^2*Log[d - d*x^r] - 2*a*b*n*r*((r^2
*Log[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[
2, 1 + (e*x^r)/d]) + 2*b^2*n*r*(n*Log[x] - Log[c*x^n])*((r^2*Log[x]^2)/2 +
 (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)
/d]) + b^2*n^2*(r^2*Log[x]^2*Log[1 + d/(e*x^r)] - 2*r*Log[x]*PolyLog[2, -(
d/(e*x^r))] - 2*PolyLog[3, -(d/(e*x^r))]))/(d*r^3))
```

3.430.3 Rubi [A] (verified)

Time = 0.41 (sec) , antiderivative size = 91, normalized size of antiderivative = 0.97, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.120$, Rules used = {2779, 2821, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx$$

$$\Big\downarrow \ 2779$$

$$\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}$$

$$\Big\downarrow \ 2821$$

$$\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}-\frac{bn\int \frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{x}dx}{r}\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}$$

$$\Big\downarrow \ 7143$$

$$\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}+\frac{bn\,\text{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{r^2}\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)),x]
```

output
```
-(((a + b*Log[c*x^n])^2*Log[1 + d/(e*x^r)])/(d*r)) + (2*b*n*(((a + b*Log[c
*x^n])*PolyLog[2, -(d/(e*x^r))])/r + (b*n*PolyLog[3, -(d/(e*x^r))])/r^2))/
(d*r)
```

3.430.3.1 Defintions of rubi rules used

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.430.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.80 (sec) , antiderivative size = 580, normalized size of antiderivative = 6.17

method	result
risch	$-\frac{b^2\ln(d+e\,x^r)\ln(x)^2n^2}{rd}+\frac{2b^2\ln(d+e\,x^r)\ln(x)\ln(x^n)n}{rd}-\frac{b^2\ln(d+e\,x^r)\ln(x^n)^2}{rd}+\frac{b^2\ln(x^r)\ln(x)^2n^2}{rd}-\frac{2b^2\ln(x^r)\ln(x)\ln(x}{rd}$

input
```
int((a+b*ln(c*x^n))^2/x/(d+e*x^r),x,method=_RETURNVERBOSE)
```

output
```
-b^2/r/d*ln(d+e*x^r)*ln(x)^2*n^2+2*b^2/r/d*ln(d+e*x^r)*ln(x)*ln(x^n)*n-b^2
/r/d*ln(d+e*x^r)*ln(x^n)^2+b^2/r/d*ln(x^r)*ln(x)^2*n^2-2*b^2/r/d*ln(x^r)*l
n(x)*ln(x^n)*n+b^2/r/d*ln(x^r)*ln(x^n)^2-2/3*b^2/d*ln(x)^3*n^2+b^2/r*n^2/d
*ln(x)^2*ln(1+e*x^r/d)+2*b^2/r^3*n^2/d*polylog(3,-e*x^r/d)+b^2*n/d*ln(x^n)
*ln(x)^2-2*b^2/r*n/d*ln(x)*ln(1+e*x^r/d)*ln(x^n)-2*b^2/r^2*n/d*polylog(2,-
e*x^r/d)*ln(x^n)+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(
I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^
n)^3+2*b*ln(c)+2*a)*b/r*((ln(x^n)-n*ln(x))*(-1/d*ln(d+e*x^r)+1/d*ln(x^r))-
n/r/d*(-1/2*r^2*ln(x)^2+r*ln(x)*ln(1+e*x^r/d)+polylog(2,-e*x^r/d)))+1/4*(-
I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^
2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)
^2*(-1/r/d*ln(d+e*x^r)+1/r/d*ln(x^r))
```

3.430.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 228 vs. $2(93) = 186$.

Time = 0.26 (sec) , antiderivative size = 228, normalized size of antiderivative = 2.43

$$\int \frac{(a + b\log(cx^n))^2}{x(d + ex^r)}\,dx$$
$$= \frac{b^2n^2r^3\log(x)^3 + 6\,b^2n^2\mathrm{polylog}\left(3, -\frac{ex^r}{d}\right) + 3\left(b^2nr^3\log(c) + abnr^3\right)\log(x)^2 - 6\left(b^2n^2r\log(x) + b^2nr\log(\right.}{}$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r),x, algorithm="fricas")
```

output
```
1/3*(b^2*n^2*r^3*log(x)^3 + 6*b^2*n^2*polylog(3, -e*x^r/d) + 3*(b^2*n*r^3*
log(c) + a*b*n*r^3)*log(x)^2 - 6*(b^2*n^2*r*log(x) + b^2*n*r*log(c) + a*b*
n*r)*dilog(-(e*x^r + d)/d + 1) - 3*(b^2*r^2*log(c)^2 + 2*a*b*r^2*log(c) +
a^2*r^2)*log(e*x^r + d) + 3*(b^2*r^3*log(c)^2 + 2*a*b*r^3*log(c) + a^2*r^3
)*log(x) - 3*(b^2*n^2*r^2*log(x)^2 + 2*(b^2*n*r^2*log(c) + a*b*n*r^2)*log(
x))*log((e*x^r + d)/d))/(d*r^3)
```

3.430.6 Sympy [F]

$$\int \frac{(a + b\log(cx^n))^2}{x(d + ex^r)}\,dx = \int \frac{(a + b\log(cx^n))^2}{x(d + ex^r)}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(d+e*x**r),x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x*(d + e*x**r)), x)
```

3.430.7 Maxima [F]

$$\int \frac{(a + b\log(cx^n))^2}{x(d + ex^r)}\,dx = \int \frac{(b\log(cx^n) + a)^2}{(ex^r + d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r),x, algorithm="maxima")
```

output
```
a^2*(log(x)/d - log((e*x^r + d)/e)/(d*r)) + integrate((b^2*log(c)^2 + b^2*
log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e*x*x^r + d*x)
, x)
```

3.430.8 Giac [F]

$$\int \frac{(a + b\log(cx^n))^2}{x(d + ex^r)}\,dx = \int \frac{(b\log(cx^n) + a)^2}{(ex^r + d)x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x^r + d)*x), x)
```

3.430.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)}\,dx=\int \frac{(a+b\,\ln(c\,x^n))^2}{x\,(d+e\,x^r)}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x*(d + e*x^r)),x)
```

output
```
int((a + b*log(c*x^n))^2/(x*(d + e*x^r)), x)
```

3.431 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx$

3.431.1 Optimal result

Integrand size = 25, antiderivative size = 182

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx = \frac{(a+b\log(cx^n))^2}{dr(d+ex^r)} + \frac{2bn(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r^2} - \frac{(a+b\log(cx^n))^2\log\left(1+\frac{dx^{-r}}{e}\right)}{d^2r} - \frac{2b^2n^2\operatorname{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^2r^3} + \frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^2r^2} + \frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{d^2r^3}$$

output
```
(a+b*ln(c*x^n))^2/d/r/(d+e*x^r)+2*b*n*(a+b*ln(c*x^n))*ln(1+d/e/(x^r))/d^2/
r^2-(a+b*ln(c*x^n))^2*ln(1+d/e/(x^r))/d^2/r-2*b^2*n^2*polylog(2,-d/e/(x^r)
)/d^2/r^3+2*b*n*(a+b*ln(c*x^n))*polylog(2,-d/e/(x^r))/d^2/r^2+2*b^2*n^2*po
lylog(3,-d/e/(x^r))/d^2/r^3
```

3.431.2 Mathematica [B] (warning: unable to verify)

Leaf count is larger than twice the leaf count of optimal. 397 vs. $2(182) = 364$.

Time = 0.25 (sec) , antiderivative size = 397, normalized size of antiderivative = 2.18

$$\int \frac{(a + b\log(cx^n))^2}{x(d + ex^r)^2} dx$$
$$= \frac{\frac{dr^2(a+b\log(cx^n))^2}{d+ex^r} + 2abnr\log(d - dx^r) - a^2r^2\log(d - dx^r) + 2abr^2(n\log(x) - \log(cx^n))\log(d - dx^r) + 2}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)^2),x]
```

output
```
((d*r^2*(a + b*Log[c*x^n])^2)/(d + e*x^r) + 2*a*b*n*r*Log[d - d*x^r] - a^2
*r^2*Log[d - d*x^r] + 2*a*b*r^2*(n*Log[x] - Log[c*x^n])*Log[d - d*x^r] + 2
*b^2*n*r*(-(n*Log[x]) + Log[c*x^n])*Log[d - d*x^r] - b^2*r^2*(-(n*Log[x])
+ Log[c*x^n])^2*Log[d - d*x^r] - 2*b^2*n^2*((r^2*Log[x]^2)/2 + (-(r*Log[x]
) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/d]) + 2*a*b
*n*r*((r^2*Log[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r]
+ PolyLog[2, 1 + (e*x^r)/d]) + 2*b^2*n*r*(-(n*Log[x]) + Log[c*x^n])*((r^2*
Log[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2
, 1 + (e*x^r)/d]) - b^2*n^2*(r^2*Log[x]^2*Log[1 + d/(e*x^r)] - 2*r*Log[x]*
PolyLog[2, -(d/(e*x^r))] - 2*PolyLog[3, -(d/(e*x^r))]))/(d^2*r^3)
```

3.431.3 Rubi [A] (verified)

Time = 0.96 (sec) , antiderivative size = 196, normalized size of antiderivative = 1.08, number of steps used = 6, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}} = 0.240$, Rules used = {2791, 2776, 2779, 2821, 2838, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a + b\log(cx^n))^2}{x(d + ex^r)^2} dx$$
$$\Big\downarrow \; 2791$$
$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)} dx}{d} - \frac{e\int \frac{x^{r-1}(a+b\log(cx^n))^2}{(ex^r+d)^2} dx}{d}$$
$$\Big\downarrow \; 2776$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{2bn\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{er}-\frac{(a+b\log(cx^n))^2}{er(d+ex^r)}\right)}{d}$$

$\Big\downarrow$ 2779

$$\frac{\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d}-\frac{e\left(\frac{2bn\left(\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}\right)}{er}-\frac{(a+b\log(cx^n))^2}{er(d+ex^r)}\right)}{d}$$

$\Big\downarrow$ 2821

$$\frac{\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}-\frac{bn\int \frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{x}dx}{r}\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d}-\frac{e\left(\frac{2bn\left(\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}\right)}{er}-\frac{(a+b\log(cx^n))^2}{er(d+ex^r)}\right)}{d}$$

$\Big\downarrow$ 2838

$$\frac{\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}-\frac{bn\int \frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{x}dx}{r}\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d}-\frac{e\left(\frac{2bn\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}\right)}{er}-\frac{(a+b\log(cx^n))^2}{er(d+ex^r)}\right)}{d}$$

$\Big\downarrow$ 7143

3.431. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx$

$$\frac{\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}+\frac{bn\,\text{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{r^2}\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d}-\frac{e\left(\frac{2bn\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}\right)}{er}-\frac{(a+b\log(cx^n))^2}{er(d+ex^r)}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)^2),x]
```

output
```
-((e*(-((a + b*Log[c*x^n])^2/(e*r*(d + e*x^r))) + (2*b*n*(-(((a + b*Log[c*
x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*PolyLog[2, -(d/(e*x^r))])/(d*r^2))
)/(e*r)))/d) + (-(((a + b*Log[c*x^n])^2*Log[1 + d/(e*x^r)])/(d*r)) + (2*b*
n*(((a + b*Log[c*x^n])*PolyLog[2, -(d/(e*x^r))])/r + (b*n*PolyLog[3, -(d/(
e*x^r))])/r^2))/(d*r))/d
```

3.431.3.1 Defintions of rubi rules used

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

3.431. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx$

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.431.4 Maple [F]

$$\int \frac{(a+b\ln(c\,x^n))^2}{x\,(d+e\,x^r)^2}dx$$

input
```
int((a+b*ln(c*x^n))^2/x/(d+e*x^r)^2,x)
```

output
```
int((a+b*ln(c*x^n))^2/x/(d+e*x^r)^2,x)
```

3.431.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 600 vs. 2(180) = 360.

Time = 0.27 (sec) , antiderivative size = 600, normalized size of antiderivative = 3.30

$$\int \frac{(a+b\log(cx^n))^2}{x\,(d+ex^r)^2}\,dx$$
$$= \frac{b^2dn^2r^3\log(x)^3 + 3\,b^2dr^2\log(c)^2 + 6\,abdr^2\log(c) + 3\,a^2dr^2 + 3\,(b^2dnr^3\log(c) + abdnr^3)\log(x)^2 + (b^2er$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
1/3*(b^2*d*n^2*r^3*log(x)^3 + 3*b^2*d*r^2*log(c)^2 + 6*a*b*d*r^2*log(c) +
3*a^2*d*r^2 + 3*(b^2*d*n*r^3*log(c) + a*b*d*n*r^3)*log(x)^2 + (b^2*e*n^2*r
^3*log(x)^3 + 3*(b^2*e*n*r^3*log(c) - b^2*e*n^2*r^2 + a*b*e*n*r^3)*log(x)^
2 + 3*(b^2*e*r^3*log(c)^2 - 2*a*b*e*n*r^2 + a^2*e*r^3 - 2*(b^2*e*n*r^2 - a
*b*e*r^3)*log(c))*log(x))*x^r - 6*(b^2*d*n^2*r*log(x) + b^2*d*n*r*log(c) -
 b^2*d*n^2 + a*b*d*n*r + (b^2*e*n^2*r*log(x) + b^2*e*n*r*log(c) - b^2*e*n^
2 + a*b*e*n*r)*x^r)*dilog(-(e*x^r + d)/d + 1) - 3*(b^2*d*r^2*log(c)^2 - 2*
a*b*d*n*r + a^2*d*r^2 + (b^2*e*r^2*log(c)^2 - 2*a*b*e*n*r + a^2*e*r^2 - 2*
(b^2*e*n*r - a*b*e*r^2)*log(c))*x^r - 2*(b^2*d*n*r - a*b*d*r^2)*log(c))*lo
g(e*x^r + d) + 3*(b^2*d*r^3*log(c)^2 + 2*a*b*d*r^3*log(c) + a^2*d*r^3)*log
(x) - 3*(b^2*d*n^2*r^2*log(x)^2 + (b^2*e*n^2*r^2*log(x)^2 + 2*(b^2*e*n*r^2
*log(c) - b^2*e*n^2*r + a*b*e*n*r^2)*log(x))*x^r + 2*(b^2*d*n*r^2*log(c) -
 b^2*d*n^2*r + a*b*d*n*r^2)*log(x))*log((e*x^r + d)/d) + 6*(b^2*e*n^2*x^r
+ b^2*d*n^2)*polylog(3, -e*x^r/d))/(d^2*e*r^3*x^r + d^3*r^3)
```

3.431.6 Sympy [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx = \int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(d+e*x**r)**2,x)
```

output
```
Integral((a + b*log(c*x**n))**2/(x*(d + e*x**r)**2), x)
```

3.431.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^r+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
a^2*(1/(d*e*r*x^r + d^2*r) + log(x)/d^2 - log((e*x^r + d)/e)/(d^2*r)) + in
tegrate((b^2*log(c)^2 + b^2*log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*
b)*log(x^n))/(e^2*x*x^(2*r) + 2*d*e*x*x^r + d^2*x), x)
```

3.431.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^r+d)^2x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x^r + d)^2*x), x)
```

3.431.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^2}\,dx = \int \frac{(a+b\,\ln(c\,x^n))^2}{x\,(d+e\,x^r)^2}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x*(d + e*x^r)^2),x)
```

output
```
int((a + b*log(c*x^n))^2/(x*(d + e*x^r)^2), x)
```

3.432 $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx$

3.432.1 Optimal result

Integrand size = 25, antiderivative size = 267

$$\begin{aligned}\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx &= \frac{benx^r(a+b\log(cx^n))}{d^3r^2(d+ex^r)} + \frac{(a+b\log(cx^n))^2}{2dr(d+ex^r)^2} \\ &\quad + \frac{(a+b\log(cx^n))^2}{d^2r(d+ex^r)} + \frac{3bn(a+b\log(cx^n))\log\left(1+\frac{dx^{-r}}{e}\right)}{d^3r^2} \\ &\quad - \frac{(a+b\log(cx^n))^2\log\left(1+\frac{dx^{-r}}{e}\right)}{d^3r} \\ &\quad - \frac{b^2n^2\log(d+ex^r)}{d^3r^3} - \frac{3b^2n^2\operatorname{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^3r^3} \\ &\quad + \frac{2bn(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{d^3r^2} \\ &\quad + \frac{2b^2n^2\operatorname{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{d^3r^3}\end{aligned}$$

output
```
b*e*n*x^r*(a+b*ln(c*x^n))/d^3/r^2/(d+e*x^r)+1/2*(a+b*ln(c*x^n))^2/d/r/(d+e
*x^r)^2+(a+b*ln(c*x^n))^2/d^2/r/(d+e*x^r)+3*b*n*(a+b*ln(c*x^n))*ln(1+d/e/(
x^r))/d^3/r^2-(a+b*ln(c*x^n))^2*ln(1+d/e/(x^r))/d^3/r-b^2*n^2*ln(d+e*x^r)/
d^3/r^3-3*b^2*n^2*polylog(2,-d/e/(x^r))/d^3/r^3+2*b*n*(a+b*ln(c*x^n))*poly
log(2,-d/e/(x^r))/d^3/r^2+2*b^2*n^2*polylog(3,-d/e/(x^r))/d^3/r^3
```

3.432.2 Mathematica [A] (warning: unable to verify)

Time = 0.37 (sec) , antiderivative size = 459, normalized size of antiderivative = 1.72

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx = \frac{\frac{d^2r^2(a+b\log(cx^n))^2}{(d+ex^r)^2}+\frac{2dr(a+b\log(cx^n))(-bn+ar+br\log(cx^n))}{d+ex^r}-2b^2n^2\log(d-dx^r)+6abnr\log(d-dx^r)-2a^2r^2\log}{}$$

input
```
Integrate[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)^3),x]
```

output
```
((d^2*r^2*(a + b*Log[c*x^n])^2)/(d + e*x^r)^2 + (2*d*r*(a + b*Log[c*x^n])*
(-(b*n) + a*r + b*r*Log[c*x^n]))/(d + e*x^r) - 2*b^2*n^2*Log[d - d*x^r] +
6*a*b*n*r*Log[d - d*x^r] - 2*a^2*r^2*Log[d - d*x^r] + 4*a*b*r^2*(n*Log[x]
- Log[c*x^n])*Log[d - d*x^r] + 6*b^2*n*r*(-(n*Log[x]) + Log[c*x^n])*Log[d
- d*x^r] - 2*b^2*r^2*(-(n*Log[x]) + Log[c*x^n])^2*Log[d - d*x^r] - 6*b^2*n
^2*((r^2*Log[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^r)/d)])*Log[d + e*x^r] +
PolyLog[2, 1 + (e*x^r)/d]) + 4*a*b*n*r*((r^2*Log[x]^2)/2 + (-(r*Log[x]) +
Log[-((e*x^r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/d]) + 4*b^2*n*r
*(-(n*Log[x]) + Log[c*x^n])*((r^2*Log[x]^2)/2 + (-(r*Log[x]) + Log[-((e*x^
r)/d)])*Log[d + e*x^r] + PolyLog[2, 1 + (e*x^r)/d]) - 2*b^2*n^2*(r^2*Log[x
]^2*Log[1 + d/(e*x^r)] - 2*r*Log[x]*PolyLog[2, -(d/(e*x^r))] - 2*PolyLog[3
, -(d/(e*x^r))]))/(2*d^3*r^3)
```

3.432.3 Rubi [A] (verified)

Time = 2.10 (sec) , antiderivative size = 364, normalized size of antiderivative = 1.36, number of steps used = 10, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.400, Rules used = {2791, 2776, 2791, 2773, 792, 2776, 2779, 2821, 2838, 7143}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx$$

$$\Big\downarrow \text{2791}$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)^2}dx}{d}-\frac{e\int \frac{x^{r-1}(a+b\log(cx^n))^2}{(ex^r+d)^3}dx}{d}$$

$$\Big\downarrow \; 2776$$

$$\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)^2}dx}{d} - \frac{e\left(\frac{bn\int \frac{a+b\log(cx^n)}{x(ex^r+d)^2}dx}{er} - \frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \; 2791$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)}dx}{d} - \frac{e\int \frac{x^{r-1}(a+b\log(cx^n))^2}{(ex^r+d)^2}dx}{d}}{d} - \frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d} - \frac{e\int \frac{x^{r-1}(a+b\log(cx^n))}{(ex^r+d)^2}dx}{d}\right)}{er} - \frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \; 2773$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)}dx}{d} - \frac{e\int \frac{x^{r-1}(a+b\log(cx^n))^2}{(ex^r+d)^2}dx}{d}}{d} - \frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d} - \frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)} - \frac{bn\int \frac{x^{r-1}}{ex^r+d}dx}{dr}\right)}{d}\right)}{er} - \frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \; 792$$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)}dx}{d} - \frac{e\int \frac{x^{r-1}(a+b\log(cx^n))^2}{(ex^r+d)^2}dx}{d}}{d} - \frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d} - \frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)} - \frac{bn\log(d+ex^r)}{der^2}\right)}{d}\right)}{er} - \frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \; 2776$$

3.432. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx$

$$\frac{\frac{\int \frac{(a+b\log(cx^n))^2}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{2bn\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{er}-\frac{(a+b\log(cx^n))^2}{er(d+ex^r)}\right)}{d}}{d}-\frac{e\left(\frac{bn\left(\frac{\int \frac{a+b\log(cx^n)}{x(ex^r+d)}dx}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}\right)}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \; 2779$$

$$\frac{\frac{\frac{2bn\int \frac{(a+b\log(cx^n))\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d}-\frac{e\left(\frac{2bn\left(\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}\right)}{er}-\frac{(a+b\log(cx}{er(d+ex}\right.}{d}}{d}$$

$$-\frac{e\left(\frac{bn\left(\frac{\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}\right)}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \; 2821$$

$$\frac{\frac{\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}-bn\int \frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{r}dx\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d}-\frac{e\left(\frac{2bn\left(\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}\right.}{}\right.}{er}\right.}{d}}{d}$$

$$-\frac{e\left(\frac{bn\left(\frac{\frac{bn\int \frac{\log\left(\frac{dx^{-r}}{e}+1\right)}{x}dx}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}\right)}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \; 2838$$

3.432. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx$

$$\frac{\frac{\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}-\frac{bn\int\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{x}dx}{r}\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d}-\frac{e\left(\frac{2bn\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}\cdots\right)}{\cdots}\right)}{er}\cdots\right)}{d}}{d}$$

$$\frac{e\left(\frac{bn\left(\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}\right)}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

$$\Big\downarrow \; 7143$$

$$\frac{\frac{\frac{2bn\left(\frac{\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)(a+b\log(cx^n))}{r}+\frac{bn\,\text{PolyLog}\left(3,-\frac{dx^{-r}}{e}\right)}{r^2}\right)}{dr}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))^2}{dr}}{d}-\frac{e\left(\frac{2bn\left(\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)\cdots}{d\cdots}\right)}{er}\cdots\right)}{d}}{d}$$

$$\frac{e\left(\frac{bn\left(\frac{\frac{bn\,\text{PolyLog}\left(2,-\frac{dx^{-r}}{e}\right)}{dr^2}-\frac{\log\left(\frac{dx^{-r}}{e}+1\right)(a+b\log(cx^n))}{dr}}{d}-\frac{e\left(\frac{x^r(a+b\log(cx^n))}{dr(d+ex^r)}-\frac{bn\log(d+ex^r)}{der^2}\right)}{d}\right)}{er}-\frac{(a+b\log(cx^n))^2}{2er(d+ex^r)^2}\right)}{d}$$

input
```
Int[(a + b*Log[c*x^n])^2/(x*(d + e*x^r)^3),x]
```

output
```
-((e*(-1/2*(a + b*Log[c*x^n])^2/(e*r*(d + e*x^r)^2) + (b*n*(-((e*((x^r*(a
+ b*Log[c*x^n]))/(d*r*(d + e*x^r)) - (b*n*Log[d + e*x^r])/(d*e*r^2)))/d) +
 (-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b*n*PolyLog[2, -(d/(
e*x^r))])/(d*r^2))/d))/(e*r)))/d) + (-((e*(-((a + b*Log[c*x^n])^2/(e*r*(d
+ e*x^r))) + (2*b*n*(-(((a + b*Log[c*x^n])*Log[1 + d/(e*x^r)])/(d*r)) + (b
*n*PolyLog[2, -(d/(e*x^r))])/(d*r^2)))/(e*r)))/d) + (-(((a + b*Log[c*x^n])
^2*Log[1 + d/(e*x^r)])/(d*r)) + (2*b*n*(((a + b*Log[c*x^n])*PolyLog[2, -(d
/(e*x^r))])/r + (b*n*PolyLog[3, -(d/(e*x^r))])/r^2))/(d*r))/d)/d
```

3.432. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx$

3.432.3.1 Defintions of rubi rules used

rule 792
```
Int[(x_)^(m_.)/((a_) + (b_.)*(x_)^(n_)), x_Symbol] :> Simp[Log[RemoveConten
t[a + b*x^n, x]]/(b*n), x] /; FreeQ[{a, b, m, n}, x] && EqQ[m, n - 1]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

rule 2776
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_))^(q_.), x_Symbol] :> Simp[f^m*(d + e*x^r)^(q + 1)*((a + b*L
og[c*x^n])^p/(e*r*(q + 1))), x] - Simp[b*f^m*n*(p/(e*r*(q + 1)))   Int[(d +
 e*x^r)^(q + 1)*((a + b*Log[c*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d
, e, f, m, n, q, r}, x] && EqQ[m, r - 1] && IGtQ[p, 0] && (IntegerQ[m] || G
tQ[f, 0]) && NeQ[r, n] && NeQ[q, -1]
```

rule 2779
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)/((x_)*((d_) + (e_.)*(x_)^(r
_.))), x_Symbol] :> Simp[(-Log[1 + d/(e*x^r)])*((a + b*Log[c*x^n])^p/(d*r))
, x] + Simp[b*n*(p/(d*r))   Int[Log[1 + d/(e*x^r)]*((a + b*Log[c*x^n])^(p -
 1)/x), x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0]
```

rule 2791
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_)^(r_.))^
(q_))/(x_), x_Symbol] :> Simp[1/d   Int[(d + e*x^r)^(q + 1)*((a + b*Log[c*x
^n])^p/x), x], x] - Simp[e/d   Int[x^(r - 1)*(d + e*x^r)^q*(a + b*Log[c*x^n
])^p, x], x] /; FreeQ[{a, b, c, d, e, n, r}, x] && IGtQ[p, 0] && ILtQ[q, -1
]
```

rule 2821
```
Int[(Log[(d_.)*((e_) + (f_.)*(x_)^(m_.))]*((a_.) + Log[(c_.)*(x_)^(n_.)]*(b
_.))^(p_.))/(x_), x_Symbol] :> Simp[(-PolyLog[2, (-d)*f*x^m])*((a + b*Log[c
*x^n])^p/m), x] + Simp[b*n*(p/m)   Int[PolyLog[2, (-d)*f*x^m]*((a + b*Log[c
*x^n])^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, m, n}, x] && IGtQ[p,
0] && EqQ[d*e, 1]
```

rule 2838
```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> Simp[-PolyLog[2
, (-c)*e*x^n]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

3.432. $\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx$

rule 7143
```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

3.432.4 Maple [F]

$$\int \frac{(a+b\ln(c\,x^n))^2}{x\,(d+e\,x^r)^3}dx$$

input
```
int((a+b*ln(c*x^n))^2/x/(d+e*x^r)^3,x)
```

output
```
int((a+b*ln(c*x^n))^2/x/(d+e*x^r)^3,x)
```

3.432.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1165 vs. 2(263) = 526.

Time = 0.28 (sec) , antiderivative size = 1165, normalized size of antiderivative = 4.36

$$\int \frac{(a+b\log(cx^n))^2}{x\,(d+ex^r)^3}\,dx = \text{Too large to display}$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^3,x, algorithm="fricas")
```

output
```
1/6*(2*b^2*d^2*n^2*r^3*log(x)^3 + 9*b^2*d^2*r^2*log(c)^2 - 6*a*b*d^2*n*r +
 9*a^2*d^2*r^2 + 6*(b^2*d^2*n*r^3*log(c) + a*b*d^2*n*r^3)*log(x)^2 + (2*b^
2*e^2*n^2*r^3*log(x)^3 + 3*(2*b^2*e^2*n*r^3*log(c) - 3*b^2*e^2*n^2*r^2 + 2
*a*b*e^2*n*r^3)*log(x)^2 + 6*(b^2*e^2*r^3*log(c)^2 + b^2*e^2*n^2*r - 3*a*b
*e^2*n*r^2 + a^2*e^2*r^3 - (3*b^2*e^2*n*r^2 - 2*a*b*e^2*r^3)*log(c))*log(x
))*x^(2*r) + 2*(2*b^2*d*e*n^2*r^3*log(x)^3 + 3*b^2*d*e*r^2*log(c)^2 - 3*a*
b*d*e*n*r + 3*a^2*d*e*r^2 + 6*(b^2*d*e*n*r^3*log(c) - b^2*d*e*n^2*r^2 + a*
b*d*e*n*r^3)*log(x)^2 - 3*(b^2*d*e*n*r - 2*a*b*d*e*r^2)*log(c) + 3*(2*b^2*
d*e*r^3*log(c)^2 + b^2*d*e*n^2*r - 4*a*b*d*e*n*r^2 + 2*a^2*d*e*r^3 - 4*(b^
2*d*e*n*r^2 - a*b*d*e*r^3)*log(c))*log(x))*x^r - 6*(2*b^2*d^2*n^2*r*log(x)
 + 2*b^2*d^2*n*r*log(c) - 3*b^2*d^2*n^2 + 2*a*b*d^2*n*r + (2*b^2*e^2*n^2*r
*log(x) + 2*b^2*e^2*n*r*log(c) - 3*b^2*e^2*n^2 + 2*a*b*e^2*n*r)*x^(2*r) +
2*(2*b^2*d*e*n^2*r*log(x) + 2*b^2*d*e*n*r*log(c) - 3*b^2*d*e*n^2 + 2*a*b*d
*e*n*r)*x^r)*dilog(-(e*x^r + d)/d + 1) - 6*(b^2*d^2*r^2*log(c)^2 + b^2*d^2
*n^2 - 3*a*b*d^2*n*r + a^2*d^2*r^2 + (b^2*e^2*r^2*log(c)^2 + b^2*e^2*n^2 -
 3*a*b*e^2*n*r + a^2*e^2*r^2 - (3*b^2*e^2*n*r - 2*a*b*e^2*r^2)*log(c))*x^(
2*r) + 2*(b^2*d*e*r^2*log(c)^2 + b^2*d*e*n^2 - 3*a*b*d*e*n*r + a^2*d*e*r^2
 - (3*b^2*d*e*n*r - 2*a*b*d*e*r^2)*log(c))*x^r - (3*b^2*d^2*n*r - 2*a*b*d^
2*r^2)*log(c))*log(e*x^r + d) - 6*(b^2*d^2*n*r - 3*a*b*d^2*r^2)*log(c) + 6
*(b^2*d^2*r^3*log(c)^2 + 2*a*b*d^2*r^3*log(c) + a^2*d^2*r^3)*log(x) - 6...
```

3.432.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))**2/x/(d+e*x**r)**3,x)
```

output
```
Timed out
```

3.432.7 Maxima [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^r+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^3,x, algorithm="maxima")
```

output
```
1/2*a^2*((2*e*x^r + 3*d)/(d^2*e^2*r*x^(2*r) + 2*d^3*e*r*x^r + d^4*r) + 2*l
og(x)/d^3 - 2*log((e*x^r + d)/e)/(d^3*r)) + integrate((b^2*log(c)^2 + b^2*
log(x^n)^2 + 2*a*b*log(c) + 2*(b^2*log(c) + a*b)*log(x^n))/(e^3*x*x^(3*r)
+ 3*d*e^2*x*x^(2*r) + 3*d^2*e*x*x^r + d^3*x), x)
```

3.432.8 Giac [F]

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx = \int \frac{(b\log(cx^n)+a)^2}{(ex^r+d)^3x}\,dx$$

input
```
integrate((a+b*log(c*x^n))^2/x/(d+e*x^r)^3,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)^2/((e*x^r + d)^3*x), x)
```

3.432.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(a+b\log(cx^n))^2}{x(d+ex^r)^3}\,dx = \int \frac{(a+b\ln(c\,x^n))^2}{x\,(d+e\,x^r)^3}\,dx$$

input
```
int((a + b*log(c*x^n))^2/(x*(d + e*x^r)^3),x)
```

output
```
int((a + b*log(c*x^n))^2/(x*(d + e*x^r)^3), x)
```

3.433 $\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x} dx$

3.433.1 Optimal result

Integrand size = 25, antiderivative size = 327

$$\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x} dx = -\frac{92bd^2n\sqrt{d+ex^r}}{15r^2} - \frac{32bdn(d+ex^r)^{3/2}}{45r^2} - \frac{4bn(d+ex^r)^{5/2}}{25r^2} + \frac{92bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15r^2} + \frac{2bd^{5/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2} + \frac{2}{15}\left(\frac{15d^2\sqrt{d+ex^r}}{r} + \frac{5d(d+ex^r)^{3/2}}{r} + \frac{3(d+ex^r)^{5/2}}{r} - \frac{15d^{5/2}\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n)) - \frac{4bd^{5/2}n}{}$$

output
```
-32/45*b*d*n*(d+e*x^r)^(3/2)/r^2-4/25*b*n*(d+e*x^r)^(5/2)/r^2+92/15*b*d^(5
/2)*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))/r^2+2*b*d^(5/2)*n*arctanh((d+e*x^r)
^(1/2)/d^(1/2))^2/r^2-4*b*d^(5/2)*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*ln(2*
d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2-2*b*d^(5/2)*n*polylog(2,1-2*d^(1/2)
/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2-92/15*b*d^2*n*(d+e*x^r)^(1/2)/r^2+2/15*(a+
b*ln(c*x^n))*(5*d*(d+e*x^r)^(3/2)/r+3*(d+e*x^r)^(5/2)/r-15*d^(5/2)*arctanh
((d+e*x^r)^(1/2)/d^(1/2))/r+15*d^2*(d+e*x^r)^(1/2)/r)
```

3.433.2 Mathematica [F]

$$\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx$$

input
```
Integrate[((d + e*x^r)^(5/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
Integrate[((d + e*x^r)^(5/2)*(a + b*Log[c*x^n]))/x, x]
```

3.433.3 Rubi [A] (verified)

Time = 0.77 (sec) , antiderivative size = 318, normalized size of antiderivative = 0.97, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx$$

$$\Big\downarrow \text{2790}$$

$$\frac{2}{15}\left(-\frac{15d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}+\frac{15d^2\sqrt{d+ex^r}}{r}+\frac{5d(d+ex^r)^{3/2}}{r}+\frac{3(d+ex^r)^{5/2}}{r}\right)(a+b\log(cx^n))-bn\int\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)d^{5/2}}{rx}+\frac{2\sqrt{ex^r+d}d^2}{rx}+\frac{2(ex^r+d)^{3/2}d}{3rx}+\frac{2(ex^r+d)^{5/2}}{5rx}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{2}{15}\left(-\frac{15d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}+\frac{15d^2\sqrt{d+ex^r}}{r}+\frac{5d(d+ex^r)^{3/2}}{r}+\frac{3(d+ex^r)^{5/2}}{r}\right)(a+b\log(cx^n))-bn\left(-\frac{2d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2}-\frac{92d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15r^2}+\frac{4d^{5/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{r^2}+\frac{2d^{5/2}\text{Po}}{}\right.$$

input
```
Int[((d + e*x^r)^(5/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(2*((15*d^2*Sqrt[d + e*x^r])/r + (5*d*(d + e*x^r)^(3/2))/r + (3*(d + e*x^r
)^(5/2))/r - (15*d^(5/2)*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/r)*(a + b*Log[c
*x^n]))/15 - b*n*((92*d^2*Sqrt[d + e*x^r])/(15*r^2) + (32*d*(d + e*x^r)^(3
/2))/(45*r^2) + (4*(d + e*x^r)^(5/2))/(25*r^2) - (92*d^(5/2)*ArcTanh[Sqrt[
d + e*x^r]/Sqrt[d]])/(15*r^2) - (2*d^(5/2)*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]
]^2)/r^2 + (4*d^(5/2)*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sq
rt[d] - Sqrt[d + e*x^r])])/r^2 + (2*d^(5/2)*PolyLog[2, 1 - (2*Sqrt[d])/(Sq
rt[d] - Sqrt[d + e*x^r])])/r^2)
```

3.433.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

3.433.4 Maple [F]

$$\int \frac{(d+e\,x^{r})^{\frac{5}{2}}\left(a+b\ln\left(c\,x^{n}\right)\right)}{x}dx$$

input
```
int((d+e*x^r)^(5/2)*(a+b*ln(c*x^n))/x,x)
```

output
```
int((d+e*x^r)^(5/2)*(a+b*ln(c*x^n))/x,x)
```

3.433.5 Fricas [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^{5/2}\left(a+b\log\left(cx^n\right)\right)}{x}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((d+e*x^r)^(5/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >> Error detected within library code: inte
grate: implementation incomplete (has polynomial part)
```

3.433.6 Sympy [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx = \text{Timed out}$$

input
```
integrate((d+e*x**r)**(5/2)*(a+b*ln(c*x**n))/x,x)
```

output
```
Timed out
```

3.433.7 Maxima [F]

$$\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^r+d)^{\frac{5}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^(5/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/15*(15*d^(5/2)*log((sqrt(e*x^r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d
)))/r + 2*(3*(e*x^r + d)^(5/2) + 5*(e*x^r + d)^(3/2)*d + 15*sqrt(e*x^r + d
)*d^2)/r)*a + b*integrate((e^2*x^(2*r)*log(c) + 2*d*e*x^r*log(c) + d^2*log
(c) + (e^2*x^(2*r) + 2*d*e*x^r + d^2)*log(x^n))*sqrt(e*x^r + d)/x, x)
```

3.433.8 Giac [F]

$$\int \frac{(d+ex^r)^{5/2}(a+b\log(cx^n))}{x}\,dx = \int \frac{(ex^r+d)^{\frac{5}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^(5/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^(5/2)*(b*log(c*x^n) + a)/x, x)
```

3.433.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^{5/2}\,(a+b\log{(cx^n)})}{x}\,dx=\int \frac{{\left(d+e\,x^r\right)}^{5/2}\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{x}\,dx$$

input
```
int(((d + e*x^r)^(5/2)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^(5/2)*(a + b*log(c*x^n)))/x, x)
```

3.434 $\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx$

3.434.1 Optimal result

Integrand size = 25, antiderivative size = 284

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx = -\frac{16bdn\sqrt{d+ex^r}}{3r^2}-\frac{4bn(d+ex^r)^{3/2}}{9r^2}+\frac{16bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3r^2}+\frac{2bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2}+\frac{2}{3}\left(\frac{3d\sqrt{d+ex^r}}{r}+\frac{(d+ex^r)^{3/2}}{r}-\frac{3d^{3/2}\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n))-\frac{4bd^{3/2}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\right.}{r^2}$$

output
```
-4/9*b*n*(d+e*x^r)^(3/2)/r^2+16/3*b*d^(3/2)*n*arctanh((d+e*x^r)^(1/2)/d^(1
/2))/r^2+2*b*d^(3/2)*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))^2/r^2-4*b*d^(3/2)*
n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*ln(2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))
/r^2-2*b*d^(3/2)*n*polylog(2,1-2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2-16
/3*b*d*n*(d+e*x^r)^(1/2)/r^2+2/3*(a+b*ln(c*x^n))*((d+e*x^r)^(3/2)/r-3*d^(3
/2)*arctanh((d+e*x^r)^(1/2)/d^(1/2))/r+3*d*(d+e*x^r)^(1/2)/r)
```

3.434.2 Mathematica [F]

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx=\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx$$

input
```
Integrate[((d + e*x^r)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
Integrate[((d + e*x^r)^(3/2)*(a + b*Log[c*x^n]))/x, x]
```

3.434.3 Rubi [A] (verified)

Time = 0.68 (sec) , antiderivative size = 277, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx$$

$$\Big\downarrow \text{2790}$$

$$\frac{2}{3}\left(-\frac{3d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}+\frac{3d\sqrt{d+ex^r}}{r}+\frac{(d+ex^r)^{3/2}}{r}\right)(a+b\log(cx^n))-bn\int\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)d^{3/2}}{rx}+\frac{2\sqrt{ex^r+d}d}{rx}+\frac{2(ex^r+d)^{3/2}}{3rx}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{2}{3}\left(-\frac{3d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}+\frac{3d\sqrt{d+ex^r}}{r}+\frac{(d+ex^r)^{3/2}}{r}\right)(a+b\log(cx^n))-bn\left(-\frac{2d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2}-\frac{16d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3r^2}+\frac{4d^{3/2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{r^2}+\frac{2d^{3/2}\text{Po}\ldots}{}\right.$$

input
```
Int[((d + e*x^r)^(3/2)*(a + b*Log[c*x^n]))/x,x]
```

output
```
(2*((3*d*Sqrt[d + e*x^r])/r + (d + e*x^r)^(3/2)/r - (3*d^(3/2)*ArcTanh[Sqr
t[d + e*x^r]/Sqrt[d]])/r)*(a + b*Log[c*x^n]))/3 - b*n*((16*d*Sqrt[d + e*x^
r])/(3*r^2) + (4*(d + e*x^r)^(3/2))/(9*r^2) - (16*d^(3/2)*ArcTanh[Sqrt[d +
 e*x^r]/Sqrt[d]])/(3*r^2) - (2*d^(3/2)*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)
/r^2 + (4*d^(3/2)*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d
] - Sqrt[d + e*x^r])])/r^2 + (2*d^(3/2)*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d
] - Sqrt[d + e*x^r])])/r^2)
```

3.434.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

3.434.4 Maple [F]

$$\int \frac{(d+e\,x^{r})^{\frac{3}{2}}\,(a+b\ln(c\,x^{n}))}{x}dx$$

input
```
int((d+e*x^r)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

output
```
int((d+e*x^r)^(3/2)*(a+b*ln(c*x^n))/x,x)
```

3.434.5 Fricas [F(-2)]

Exception generated.

$$\int \frac{(d+ex^r)^{3/2}\,(a+b\log(cx^n))}{x}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((d+e*x^r)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >> Error detected within library code: inte
grate: implementation incomplete (has polynomial part)
```

3.434.6 Sympy [F]

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx=\int \frac{(a+b\log(cx^n))\,(d+ex^r)^{\frac{3}{2}}}{x}\,dx$$

input
```
integrate((d+e*x**r)**(3/2)*(a+b*ln(c*x**n))/x,x)
```

output
```
Integral((a + b*log(c*x**n))*(d + e*x**r)**(3/2)/x, x)
```

3.434.7 Maxima [F]

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx=\int \frac{(ex^r+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
1/3*(3*d^(3/2)*log((sqrt(e*x^r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d))
)/r + 2*((e*x^r + d)^(3/2) + 3*sqrt(e*x^r + d)*d)/r)*a + b*integrate((e*x^
r*log(c) + d*log(c) + (e*x^r + d)*log(x^n))*sqrt(e*x^r + d)/x, x)
```

3.434.8 Giac [F]

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx=\int \frac{(ex^r+d)^{\frac{3}{2}}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^(3/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^(3/2)*(b*log(c*x^n) + a)/x, x)
```

3.434.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(d+ex^r)^{3/2}(a+b\log(cx^n))}{x}\,dx=\int \frac{(d+e\,x^r)^{3/2}\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^r)^(3/2)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^(3/2)*(a + b*log(c*x^n)))/x, x)
```

3.435 $\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx$

3.435.1 Optimal result

Integrand size = 25, antiderivative size = 240

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx = -\frac{4bn\sqrt{d+ex^r}}{r^2}+\frac{4b\sqrt{d}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2} +\frac{2b\sqrt{d}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2} +2\left(\frac{\sqrt{d+ex^r}}{r}-\frac{\sqrt{d}\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n)) -\frac{4b\sqrt{d}n\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{r^2} -\frac{2b\sqrt{d}n\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{r^2}$$

output
```
4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*d^(1/2)/r^2+2*b*n*arctanh((d+e*x^r)
^(1/2)/d^(1/2))^2*d^(1/2)/r^2-4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*ln(2*
d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))*d^(1/2)/r^2-2*b*n*polylog(2,1-2*d^(1/2)
/(d^(1/2)-(d+e*x^r)^(1/2)))*d^(1/2)/r^2-4*b*n*(d+e*x^r)^(1/2)/r^2+2*(a+b*l
n(c*x^n))*(-arctanh((d+e*x^r)^(1/2)/d^(1/2))*d^(1/2)/r+(d+e*x^r)^(1/2)/r)
```

3.435.2 Mathematica [F]

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx$$

input
```
Integrate[(Sqrt[d + e*x^r]*(a + b*Log[c*x^n]))/x,x]
```

output
```
Integrate[(Sqrt[d + e*x^r]*(a + b*Log[c*x^n]))/x, x]
```

3.435.3 Rubi [A] (verified)

Time = 0.58 (sec) , antiderivative size = 235, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.080$, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx$$

$$\Big\downarrow \ 2790$$

$$2\left(\frac{\sqrt{d+ex^r}}{r}-\frac{\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n))-bn\int\left(\frac{2\sqrt{ex^r+d}}{rx}-\frac{2\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{rx}\right)dx$$

$$\Big\downarrow \ 2009$$

$$2\left(\frac{\sqrt{d+ex^r}}{r}-\frac{\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r}\right)(a+b\log(cx^n))-bn\left(-\frac{2\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{r^2}-\frac{4\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{r^2}+\frac{4\sqrt{d}\,\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{r^2}+\frac{2\sqrt{d}\,\text{PolyLo}}{}\right.$$

input
```
Int[(Sqrt[d + e*x^r]*(a + b*Log[c*x^n]))/x,x]
```

output
```
2*(Sqrt[d + e*x^r]/r - (Sqrt[d]*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/r)*(a +
b*Log[c*x^n]) - b*n*((4*Sqrt[d + e*x^r])/r^2 - (4*Sqrt[d]*ArcTanh[Sqrt[d +
 e*x^r]/Sqrt[d]])/r^2 - (2*Sqrt[d]*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)/r^2
 + (4*Sqrt[d]*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] -
Sqrt[d + e*x^r])])/r^2 + (2*Sqrt[d]*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] -
Sqrt[d + e*x^r])])/r^2)
```

3.435.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

3.435.4 Maple [F]

$$\int \frac{\sqrt{d+e\,x^{r}}\,(a+b\ln{(c\,x^{n})})}{x}dx$$

input
```
int((d+e*x^r)^(1/2)*(a+b*ln(c*x^n))/x,x)
```

output
```
int((d+e*x^r)^(1/2)*(a+b*ln(c*x^n))/x,x)
```

3.435.5 Fricas [F(-2)]

Exception generated.

$$\int \frac{\sqrt{d+ex^r}(a+b\log{(cx^n)})}{x}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((d+e*x^r)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (has polynomial part)
```

3.435.6 Sympy [F]

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx = \int \frac{(a+b\log(cx^n))\sqrt{d+ex^r}}{x}\,dx$$

input
```
integrate((d+e*x**r)**(1/2)*(a+b*ln(c*x**n))/x,x)
```

output
```
Integral((a + b*log(c*x**n))*sqrt(d + e*x**r)/x, x)
```

3.435.7 Maxima [F]

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{ex^r+d}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="maxima")
```

output
```
a*(sqrt(d)*log((sqrt(e*x^r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d)))/r
+ 2*sqrt(e*x^r + d)/r) + b*integrate(sqrt(e*x^r + d)*(log(c) + log(x^n))/x
, x)
```

3.435.8 Giac [F]

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{ex^r+d}(b\log(cx^n)+a)}{x}\,dx$$

input
```
integrate((d+e*x^r)^(1/2)*(a+b*log(c*x^n))/x,x, algorithm="giac")
```

output
```
integrate(sqrt(e*x^r + d)*(b*log(c*x^n) + a)/x, x)
```

3.435.9 Mupad [F(-1)]

Timed out.

$$\int \frac{\sqrt{d+ex^r}(a+b\log(cx^n))}{x}\,dx = \int \frac{\sqrt{d+e\,x^r}\,(a+b\,\ln(c\,x^n))}{x}\,dx$$

input
```
int(((d + e*x^r)^(1/2)*(a + b*log(c*x^n)))/x,x)
```

output
```
int(((d + e*x^r)^(1/2)*(a + b*log(c*x^n)))/x, x)
```

3.436 $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx$

3.436.1 Optimal result

Integrand size = 25, antiderivative size = 174

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx = \frac{2bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{\sqrt{d}r^2} - \frac{2\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r} - \frac{4bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{\sqrt{d}r^2} - \frac{2bn\operatorname{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{\sqrt{d}r^2}$$

output
```
2*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))^2/r^2/d^(1/2)-2*arctanh((d+e*x^r)^(
1/2)/d^(1/2))*(a+b*ln(c*x^n))/r/d^(1/2)-4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1
/2))*ln(2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2/d^(1/2)-2*b*n*polylog(2,1
-2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/r^2/d^(1/2)
```

3.436.2 Mathematica [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx = \int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^r]),x]
```

output
```
Integrate[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^r]), x]
```

3.436.3 Rubi [A] (verified)

Time = 0.79 (sec) , antiderivative size = 161, normalized size of antiderivative = 0.93, number of steps used = 12, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.440, Rules used = {2790, 27, 7282, 7267, 25, 6546, 27, 6470, 27, 2849, 2752}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}dx$$

$$\Big\downarrow \text{ 2790}$$

$$-bn\int -\frac{2\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{\sqrt{d}rx}dx-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{2bn\int \frac{\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{x}dx}{\sqrt{d}r}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{ 7282}$$

$$\frac{2bn\int x^{-r}\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)dx^r}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{ 7267}$$

$$\frac{4bn\int -\frac{\sqrt{ex^r+d}\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{d-x^{2r}}d\sqrt{ex^r+d}}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{ 25}$$

$$-\frac{4bn\int \frac{\sqrt{ex^r+d}\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{d-x^{2r}}d\sqrt{ex^r+d}}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{ 6546}$$

$$\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2-\frac{\int \frac{\sqrt{d}\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{ex^r+d}}d\sqrt{ex^r+d}}{\sqrt{d}}\right)}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2-\int\frac{\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{\sqrt{d}-\sqrt{ex^r+d}}d\sqrt{ex^r+d}\right)}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{ 6470}$$

$$\frac{4bn\left(\frac{\int\frac{d\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^r+d}}\right)}{d-x^{2r}}d\sqrt{ex^r+d}}{\sqrt{d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)\right)}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{ 27}$$

$$\frac{4bn\left(\sqrt{d}\int\frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^r+d}}\right)}{d-x^{2r}}d\sqrt{ex^r+d}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)\right)}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{ 2849}$$

$$\frac{4bn\left(-\sqrt{d}\int\frac{\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^r+d}}\right)}{1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^r+d}}}d\frac{1}{\sqrt{d}-\sqrt{ex^r+d}}+\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)\right)}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

$$\Big\downarrow \text{ 2752}$$

$$\frac{4bn\left(\frac{1}{2}\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2-\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)-\frac{1}{2}\text{PolyLog}\left(2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{ex^r+d}}\right)\right)}{\sqrt{d}r^2}-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)(a+b\log(cx^n))}{\sqrt{d}r}$$

input
```
Int[(a + b*Log[c*x^n])/(x*Sqrt[d + e*x^r]),x]
```

3.436. $\int\frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx$

output
```
(-2*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]*(a + b*Log[c*x^n]))/(Sqrt[d]*r) + (4*
b*n*(ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2/2 - ArcTanh[Sqrt[d + e*x^r]/Sqrt[d
]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])] - PolyLog[2, 1 - (2*Sqrt[d
])/(Sqrt[d] - Sqrt[d + e*x^r])]/2))/(Sqrt[d]*r^2)
```

3.436.3.1 Defintions of rubi rules used

rule 25
```
Int[-(Fx_), x_Symbol] :> Simp[Identity[-1]   Int[Fx, x], x]
```

rule 27
```
Int[(a_)*(Fx_), x_Symbol] :> Simp[a   Int[Fx, x], x] /; FreeQ[a, x] &&  !Ma
tchQ[Fx, (b_)*(Gx_) /; FreeQ[b, x]]
```

rule 2752
```
Int[Log[(c_.)*(x_)]/((d_) + (e_.)*(x_)), x_Symbol] :> Simp[(-e^(-1))*PolyLo
g[2, 1 - c*x], x] /; FreeQ[{c, d, e}, x] && EqQ[e + c*d, 0]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

rule 2849
```
Int[Log[(c_.)/((d_) + (e_.)*(x_))]/((f_) + (g_.)*(x_)^2), x_Symbol] :> Simp
[-e/g   Subst[Int[Log[2*d*x]/(1 - 2*d*x), x], x, 1/(d + e*x)], x] /; FreeQ[
{c, d, e, f, g}, x] && EqQ[c, 2*d] && EqQ[e^2*f + d^2*g, 0]
```

rule 6470
```
Int[((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)/((d_) + (e_.)*(x_)), x_Symbol
] :> Simp[(-(a + b*ArcTanh[c*x])^p)*(Log[2/(1 + e*(x/d))]/e), x] + Simp[b*c
*(p/e)   Int[(a + b*ArcTanh[c*x])^(p - 1)*(Log[2/(1 + e*(x/d))]/(1 - c^2*x^
2)), x], x] /; FreeQ[{a, b, c, d, e}, x] && IGtQ[p, 0] && EqQ[c^2*d^2 - e^2
, 0]
```

rule 6546
```
Int[(((a_.) + ArcTanh[(c_.)*(x_)]*(b_.))^(p_.)*(x_))/((d_) + (e_.)*(x_)^2),
 x_Symbol] :> Simp[(a + b*ArcTanh[c*x])^(p + 1)/(b*e*(p + 1)), x] + Simp[1/
(c*d)   Int[(a + b*ArcTanh[c*x])^p/(1 - c*x), x], x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[c^2*d + e, 0] && IGtQ[p, 0]
```

3.436. $\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx$

rule 7267
```
Int[u_, x_Symbol] :> With[{lst = SubstForFractionalPowerOfLinear[u, x]}, Si
mp[lst[[2]]*lst[[4]]   Subst[Int[lst[[1]], x], x, lst[[3]]^(1/lst[[2]])], x
] /;  !FalseQ[lst] && SubstForFractionalPowerQ[u, lst[[3]], x]]
```

rule 7282
```
Int[(u_)/(x_), x_Symbol] :> With[{lst = PowerVariableExpn[u, 0, x]}, Simp[1
/lst[[2]]   Subst[Int[NormalizeIntegrand[Simplify[lst[[1]]/x], x], x], x, (
lst[[3]]*x)^lst[[2]]], x] /;  !FalseQ[lst] && NeQ[lst[[2]], 0]] /; NonsumQ[
u] &&  !RationalFunctionQ[u, x]
```

3.436.4 Maple [F]

$$\int \frac{a+b\ln \left(c\,x^{n}\right)}{x\sqrt{d+e\,x^{r}}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(1/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(1/2),x)
```

3.436.5 Fricas [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\sqrt{d+ex^{r}}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(1/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

3.436.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx = \int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**(1/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*sqrt(d + e*x**r)), x)
```

3.436.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex^r+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(1/2),x, algorithm="maxima")
```

output
```
b*integrate((log(c) + log(x^n))/(sqrt(e*x^r + d)*x), x) + a*log((sqrt(e*x^
r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d)))/(sqrt(d)*r)
```

3.436.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x\sqrt{d+ex^r}}\,dx = \int \frac{b\log(cx^n)+a}{\sqrt{ex^r+d}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(1/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/(sqrt(e*x^r + d)*x), x)
```

3.436.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a + b\log(cx^n)}{x\sqrt{d + ex^r}} \, dx = \int \frac{a + b\,\ln(c\,x^n)}{x\,\sqrt{d + e\,x^r}} \, dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(1/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(1/2)), x)
```

3.437 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx$

3.437.1 Optimal result

Integrand size = 25, antiderivative size = 225

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx = \frac{4bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r^2} + \frac{2bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{3/2}r^2} + 2\left(\frac{1}{dr\sqrt{d+ex^r}} - \frac{\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r}\right)(a+b\log(cx^n)) - \frac{4bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{d^{3/2}r^2} - \frac{2bn\operatorname{PolyL}}{}$$

output
```
4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))/d^(3/2)/r^2+2*b*n*arctanh((d+e*x^r)
^(1/2)/d^(1/2))^2/d^(3/2)/r^2-4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*ln(2*
d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(3/2)/r^2-2*b*n*polylog(2,1-2*d^(1/2)
/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(3/2)/r^2+2*(a+b*ln(c*x^n))*(-arctanh((d+e*x
^r)^(1/2)/d^(1/2))/d^(3/2)/r+1/d/r/(d+e*x^r)^(1/2))
```

3.437.2 Mathematica [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx = \int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(3/2)),x]
```

output
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(3/2)), x]
```

3.437.3 Rubi [A] (verified)

Time = 0.59 (sec) , antiderivative size = 222, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx$$

$$\Big\downarrow \text{2790}$$

$$2\left(\frac{1}{dr\sqrt{d+ex^r}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r}\right)(a+b\log(cx^n))-bn\int\left(\frac{2}{drx\sqrt{ex^r+d}}-\frac{2\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{d^{3/2}rx}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$2\left(\frac{1}{dr\sqrt{d+ex^r}}-\frac{\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r}\right)(a+b\log(cx^n))-bn\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{3/2}r^2}-\frac{4\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{3/2}r^2}+\frac{4\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{d^{3/2}r^2}+\frac{2\,\text{PolyLog}\left(2,1-\frac{}{\sqrt{d}\cdots}\right.}{d^{3/2}r^2}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(3/2)),x]
```

output
```
2*(1/(d*r*Sqrt[d + e*x^r]) - ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]/(d^(3/2)*r))
*(a + b*Log[c*x^n]) - b*n*((-4*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/(d^(3/2)*
r^2) - (2*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)/(d^(3/2)*r^2) + (4*ArcTanh[S
qrt[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(d^(
3/2)*r^2) + (2*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(d
^(3/2)*r^2))
```

3.437.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

3.437.4 Maple [F]

$$\int \frac{a+b\ln \left(c\,x^{n}\right)}{x \left(d+e\,x^{r}\right)^{\frac{3}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(3/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(3/2),x)
```

3.437.5 Fricas [F(-2)]

Exception generated.

$$\int \frac{a+b\log \left(cx^n\right)}{x\left(d+ex^r\right)^{3/2}}\,dx = \text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(3/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

3.437.6 Sympy [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx = \int \frac{a+b\log(cx^n)}{x(d+ex^r)^{\frac{3}{2}}}\,dx$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**(3/2),x)
```

output
```
Integral((a + b*log(c*x**n))/(x*(d + e*x**r)**(3/2)), x)
```

3.437.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(3/2),x, algorithm="maxima")
```

output
```
a*(log((sqrt(e*x^r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d)))/(d^(3/2)*r
) + 2/(sqrt(e*x^r + d)*d*r)) + b*integrate((log(c) + log(x^n))/((e*x*x^r +
 d*x)*sqrt(e*x^r + d)), x)
```

3.437.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^{\frac{3}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(3/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^(3/2)*x), x)
```

3.437.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{3/2}}\,dx = \int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x^r)^{3/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(3/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(3/2)), x)
```

3.438 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx$

3.438.1 Optimal result

Integrand size = 25, antiderivative size = 271

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx = -\frac{4bn}{3d^2r^2\sqrt{d+ex^r}}+\frac{16bn\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3d^{5/2}r^2}+\frac{2bn\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{5/2}r^2}+\frac{2}{3}\left(\frac{1}{dr(d+ex^r)^{3/2}}+\frac{3}{d^2r\sqrt{d+ex^r}}-\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{5/2}r}\right)(a+b\log(cx^n))-\frac{4bn\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\cdots\right.}{d^{5/2}r^2}$$

output
```
16/3*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))/d^(5/2)/r^2+2*b*n*arctanh((d+e*x
^r)^(1/2)/d^(1/2))^2/d^(5/2)/r^2-4*b*n*arctanh((d+e*x^r)^(1/2)/d^(1/2))*ln
(2*d^(1/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(5/2)/r^2-2*b*n*polylog(2,1-2*d^(1
/2)/(d^(1/2)-(d+e*x^r)^(1/2)))/d^(5/2)/r^2+2/3*(a+b*ln(c*x^n))*(1/d/r/(d+e
*x^r)^(3/2)-3*arctanh((d+e*x^r)^(1/2)/d^(1/2))/d^(5/2)/r+3/d^2/r/(d+e*x^r)
^(1/2))-4/3*b*n/d^2/r^2/(d+e*x^r)^(1/2)
```

3.438.2 Mathematica [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx = \int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(5/2)),x]
```

output
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(5/2)), x]
```

3.438.3 Rubi [A] (verified)

Time = 0.68 (sec) , antiderivative size = 266, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}dx$$

$$\Big\downarrow \text{2790}$$

$$\frac{2}{3}\left(-\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{5/2}r}+\frac{3}{d^2r\sqrt{d+ex^r}}+\frac{1}{dr(d+ex^r)^{3/2}}\right)(a+b\log(cx^n))-bn\int\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{d^{5/2}rx}+\frac{2}{d^2rx\sqrt{ex^r+d}}+\frac{2}{3drx(ex^r+d)^{3/2}}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{2}{3}\left(-\frac{3\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{5/2}r}+\frac{3}{d^2r\sqrt{d+ex^r}}+\frac{1}{dr(d+ex^r)^{3/2}}\right)(a+b\log(cx^n))-bn\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{5/2}r^2}-\frac{16\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{3d^{5/2}r^2}+\frac{4\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{d^{5/2}r^2}+\frac{2\,\text{PolyLog}\left(2,1-\cdots\right.}{d^{5/2}r^2}\cdots\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(5/2)),x]
```

output
```
(2*(1/(d*r*(d + e*x^r)^(3/2)) + 3/(d^2*r*Sqrt[d + e*x^r]) - (3*ArcTanh[Sqr
t[d + e*x^r]/Sqrt[d]])/(d^(5/2)*r))*(a + b*Log[c*x^n]))/3 - b*n*(4/(3*d^2*
r^2*Sqrt[d + e*x^r]) - (16*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/(3*d^(5/2)*r^
2) - (2*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)/(d^(5/2)*r^2) + (4*ArcTanh[Sqr
t[d + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(d^(5/
2)*r^2) + (2*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(d^(
5/2)*r^2))
```

3.438.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

3.438.4 Maple [F]

$$\int \frac{a+b\ln\left(c\,x^{n}\right)}{x\left(d+e\,x^{r}\right)^{\frac{5}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(5/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(5/2),x)
```

3.438.5 Fricas [F(-2)]

Exception generated.

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)^{5/2}}\,dx=\text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(5/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >>  Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

3.438.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**(5/2),x)
```

output
```
Timed out
```

3.438.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^{\frac{5}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(5/2),x, algorithm="maxima")
```

output
```
1/3*a*(3*log((sqrt(e*x^r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d)))/(d^(
5/2)*r) + 2*(3*e*x^r + 4*d)/((e*x^r + d)^(3/2)*d^2*r)) + b*integrate((log(
c) + log(x^n))/((e^2*x*x^(2*r) + 2*d*e*x*x^r + d^2*x)*sqrt(e*x^r + d)), x)
```

3.438.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{5/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^{\frac{5}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(5/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^(5/2)*x), x)
```

3.438.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log\left(cx^{n}\right)}{x\left(d+ex^{r}\right)^{5/2}}\,dx=\int \frac{a+b\,\ln\left(c\,x^{n}\right)}{x\left(d+e\,x^{r}\right)^{5/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(5/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(5/2)), x)
```

3.439 $\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx$

3.439.1 Optimal result

Integrand size = 25, antiderivative size = 314

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx = -\frac{4bn}{15d^2r^2(d+ex^r)^{3/2}}-\frac{32bn}{15d^3r^2\sqrt{d+ex^r}}+\frac{92bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15d^{7/2}r^2}+\frac{2bn\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{7/2}r^2}+\frac{2}{15}\left(\frac{3}{dr(d+ex^r)^{5/2}}+\frac{5}{d^2r(d+ex^r)^{3/2}}+\frac{15}{d^3r\sqrt{d+ex^r}}-\frac{15\operatorname{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{7/2}r}\right)(a+b\log(cx^n))-\frac{4bn\operatorname{arctan}

3.439.2 Mathematica [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx=\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx$$

input
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(7/2)),x]
```

output
```
Integrate[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(7/2)), x]
```

3.439.3 Rubi [A] (verified)

Time = 0.75 (sec) , antiderivative size = 307, normalized size of antiderivative = 0.98, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2790, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx$$

$$\Big\downarrow \text{2790}$$

$$\frac{2}{15}\left(-\frac{15\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{7/2}r}+\frac{15}{d^3r\sqrt{d+ex^r}}+\frac{5}{d^2r(d+ex^r)^{3/2}}+\frac{3}{dr(d+ex^r)^{5/2}}\right)(a+b\log(cx^n))-bn\int\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{ex^r+d}}{\sqrt{d}}\right)}{d^{7/2}rx}+\frac{2}{d^3rx\sqrt{ex^r+d}}+\frac{2}{3d^2rx(ex^r+d)^{3/2}}+\frac{2}{5drx(ex^r+d)^{5/2}}\right)dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{2}{15}\left(-\frac{15\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{d^{7/2}r}+\frac{15}{d^3r\sqrt{d+ex^r}}+\frac{5}{d^2r(d+ex^r)^{3/2}}+\frac{3}{dr(d+ex^r)^{5/2}}\right)(a+b\log(cx^n))-bn\left(-\frac{2\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)^2}{d^{7/2}r^2}-\frac{92\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)}{15d^{7/2}r^2}+\frac{4\text{arctanh}\left(\frac{\sqrt{d+ex^r}}{\sqrt{d}}\right)\log\left(\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+ex^r}}\right)}{d^{7/2}r^2}+\frac{2\,\text{PolyLog}\left(2,1-\right.}{d^{7/2}r^2}\right.$$

input
```
Int[(a + b*Log[c*x^n])/(x*(d + e*x^r)^(7/2)),x]
```

output
```
(2*(3/(d*r*(d + e*x^r)^(5/2)) + 5/(d^2*r*(d + e*x^r)^(3/2)) + 15/(d^3*r*Sq
rt[d + e*x^r]) - (15*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/(d^(7/2)*r))*(a + b
*Log[c*x^n]))/15 - b*n*(4/(15*d^2*r^2*(d + e*x^r)^(3/2)) + 32/(15*d^3*r^2*
Sqrt[d + e*x^r]) - (92*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]])/(15*d^(7/2)*r^2)
- (2*ArcTanh[Sqrt[d + e*x^r]/Sqrt[d]]^2)/(d^(7/2)*r^2) + (4*ArcTanh[Sqrt[d
 + e*x^r]/Sqrt[d]]*Log[(2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(d^(7/2)*
r^2) + (2*PolyLog[2, 1 - (2*Sqrt[d])/(Sqrt[d] - Sqrt[d + e*x^r])])/(d^(7/2
)*r^2))
```

3.439.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2790
```
Int[(((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_.))
/(x_), x_Symbol] :> With[{u = IntHide[(d + e*x^r)^q/x, x]}, Simp[u*(a + b*L
og[c*x^n]), x] - Simp[b*n   Int[1/x   u, x], x]] /; FreeQ[{a, b, c, d, e, n
, r}, x] && IntegerQ[q - 1/2]
```

3.439.4 Maple [F]

$$\int \frac{a+b\ln \left(c\,x^{n}\right)}{x\left(d+e\,x^{r}\right)^{\frac{7}{2}}}dx$$

input
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(7/2),x)
```

output
```
int((a+b*ln(c*x^n))/x/(d+e*x^r)^(7/2),x)
```

3.439.5 Fricas [F(-2)]

Exception generated.

$$\int \frac{a+b\log \left(cx^{n}\right)}{x\left(d+ex^{r}\right)^{7/2}}\,dx=\text{Exception raised: TypeError}$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(7/2),x, algorithm="fricas")
```

output
```
Exception raised: TypeError >> Error detected within library code:   inte
grate: implementation incomplete (constant residues)
```

3.439.6 Sympy [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx = \text{Timed out}$$

input
```
integrate((a+b*ln(c*x**n))/x/(d+e*x**r)**(7/2),x)
```

output
```
Timed out
```

3.439.7 Maxima [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^{\frac{7}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(7/2),x, algorithm="maxima")
```

output
```
1/15*a*(15*log((sqrt(e*x^r + d) - sqrt(d))/(sqrt(e*x^r + d) + sqrt(d)))/(d
^(7/2)*r) + 2*(15*(e*x^r + d)^2 + 5*(e*x^r + d)*d + 3*d^2)/((e*x^r + d)^(5
/2)*d^3*r)) + b*integrate((log(c) + log(x^n))/((e^3*x*x^(3*r) + 3*d*e^2*x*
x^(2*r) + 3*d^2*e*x*x^r + d^3*x)*sqrt(e*x^r + d)), x)
```

3.439.8 Giac [F]

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx = \int \frac{b\log(cx^n)+a}{(ex^r+d)^{\frac{7}{2}}x}\,dx$$

input
```
integrate((a+b*log(c*x^n))/x/(d+e*x^r)^(7/2),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)/((e*x^r + d)^(7/2)*x), x)
```

3.439.9 Mupad [F(-1)]

Timed out.

$$\int \frac{a+b\log(cx^n)}{x(d+ex^r)^{7/2}}\,dx=\int \frac{a+b\,\ln(c\,x^n)}{x\,(d+e\,x^r)^{7/2}}\,dx$$

input
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(7/2)),x)
```

output
```
int((a + b*log(c*x^n))/(x*(d + e*x^r)^(7/2)), x)
```

3.440 $\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx$

3.440.1 Optimal result

Integrand size = 25, antiderivative size = 233

$$\begin{aligned}\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx = &-\frac{3bd^2enx^{1+r}(fx)^m}{(1+m+r)^2}-\frac{3bde^2nx^{1+2r}(fx)^m}{(1+m+2r)^2}\\&-\frac{be^3nx^{1+3r}(fx)^m}{(1+m+3r)^2}-\frac{bd^3n(fx)^{1+m}}{f(1+m)^2}\\&+\frac{3d^2ex^{1+r}(fx)^m(a+b\log(cx^n))}{1+m+r}\\&+\frac{3de^2x^{1+2r}(fx)^m(a+b\log(cx^n))}{1+m+2r}\\&+\frac{e^3x^{1+3r}(fx)^m(a+b\log(cx^n))}{1+m+3r}\\&+\frac{d^3(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}\end{aligned}$$

output
```
-3*b*d^2*e*n*x^(1+r)*(f*x)^m/(1+m+r)^2-3*b*d*e^2*n*x^(1+2*r)*(f*x)^m/(1+m+
2*r)^2-b*e^3*n*x^(1+3*r)*(f*x)^m/(1+m+3*r)^2-b*d^3*n*(f*x)^(1+m)/f/(1+m)^2
+3*d^2*e*x^(1+r)*(f*x)^m*(a+b*ln(c*x^n))/(1+m+r)+3*d*e^2*x^(1+2*r)*(f*x)^m
*(a+b*ln(c*x^n))/(1+m+2*r)+e^3*x^(1+3*r)*(f*x)^m*(a+b*ln(c*x^n))/(1+m+3*r)
+d^3*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)
```

3.440.2 Mathematica [A] (verified)

Time = 0.30 (sec) , antiderivative size = 178, normalized size of antiderivative = 0.76

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx = x(fx)^m \left(-\frac{bd^3n}{(1+m)^2}-\frac{3bd^2enx^r}{(1+m+r)^2}-\frac{3bde^2nx^{2r}}{(1+m+2r)^2}-\frac{be^3nx^{3r}}{(1+m+3r)^2}+\frac{d^3(a+b\log(cx^n))}{1+m}+\frac{3d^2ex^r(a+b\log(cx^n))}{1+m+r}+\frac{3de^2x^{2r}(a+b\log(cx^n))}{1+m+2r}+\frac{e^3x^{3r}(a+b\log(cx^n))}{1+m+3r}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d^3*n)/(1 + m)^2) - (3*b*d^2*e*n*x^r)/(1 + m + r)^2 - (3*b
*d*e^2*n*x^(2*r))/(1 + m + 2*r)^2 - (b*e^3*n*x^(3*r))/(1 + m + 3*r)^2 + (d
^3*(a + b*Log[c*x^n]))/(1 + m) + (3*d^2*e*x^r*(a + b*Log[c*x^n]))/(1 + m +
 r) + (3*d*e^2*x^(2*r)*(a + b*Log[c*x^n]))/(1 + m + 2*r) + (e^3*x^(3*r)*(a
 + b*Log[c*x^n]))/(1 + m + 3*r))
```

3.440.3 Rubi [A] (verified)

Time = 2.28 (sec) , antiderivative size = 228, normalized size of antiderivative = 0.98, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2792, 2010, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \ 2792$$

$$-bn\int (fx)^m\left(\frac{3d^2ex^r}{m+r+1}+\frac{3de^2x^{2r}}{m+2r+1}+\frac{e^3x^{3r}}{m+3r+1}+\frac{d^3}{m+1}\right)dx+\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2ex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}+\frac{3de^2x^{2r+1}(fx)^m(a+b\log(cx^n))}{m+2r+1}+\frac{e^3x^{3r+1}(fx)^m(a+b\log(cx^n))}{m+3r+1}$$

$$\Big\downarrow \text{2010}$$

$$-bn\int\left(\frac{3d^2ex^r(fx)^m}{m+r+1}+\frac{3de^2x^{2r}(fx)^m}{m+2r+1}+\frac{e^3x^{3r}(fx)^m}{m+3r+1}+\frac{d^3(fx)^m}{m+1}\right)dx+\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2ex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}+\frac{3de^2x^{2r+1}(fx)^m(a+b\log(cx^n))}{m+2r+1}+\frac{e^3x^{3r+1}(fx)^m(a+b\log(cx^n))}{m+3r+1}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^3(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{3d^2ex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}+\frac{3de^2x^{2r+1}(fx)^m(a+b\log(cx^n))}{m+2r+1}+\frac{e^3x^{3r+1}(fx)^m(a+b\log(cx^n))}{m+3r+1}-bn\left(\frac{d^3(fx)^{m+1}}{f(m+1)^2}+\frac{3d^2ex^{r+1}(fx)^m}{(m+r+1)^2}+\frac{3de^2x^{2r+1}(fx)^m}{(m+2r+1)^2}+\frac{e^3x^{3r+1}(fx)^m}{(m+3r+1)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x^r)^3*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((3*d^2*e*x^(1 + r)*(f*x)^m)/(1 + m + r)^2 + (3*d*e^2*x^(1 + 2*r)*(f
*x)^m)/(1 + m + 2*r)^2 + (e^3*x^(1 + 3*r)*(f*x)^m)/(1 + m + 3*r)^2 + (d^3*
(f*x)^(1 + m))/(f*(1 + m)^2))) + (3*d^2*e*x^(1 + r)*(f*x)^m*(a + b*Log[c*x
^n]))/(1 + m + r) + (3*d*e^2*x^(1 + 2*r)*(f*x)^m*(a + b*Log[c*x^n]))/(1 +
m + 2*r) + (e^3*x^(1 + 3*r)*(f*x)^m*(a + b*Log[c*x^n]))/(1 + m + 3*r) + (d
^3*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1 + m))
```

3.440.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2010
```
Int[(u_)*((c_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandIntegrand[(c*x)^m*u, x]
, x] /; FreeQ[{c, m}, x] && SumQ[u] && !LinearQ[u, x] && !MatchQ[u, (a_)
+ (b_.)*(v_) /; FreeQ[{a, b}, x] && InverseFunctionQ[v]]
```

3.440. $\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx$

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.440.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 8182 vs. $2(233) = 466$.

Time = 57.15 (sec) , antiderivative size = 8183, normalized size of antiderivative = 35.12

method	result	size
parallelrisch	Expression too large to display	8183
risch	Expression too large to display	22640

input
```
int((f*x)^m*(d+e*x^r)^3*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
result too large to display
```

3.440.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 4918 vs. $2(233) = 466$.

Time = 0.48 (sec) , antiderivative size = 4918, normalized size of antiderivative = 21.11

$$\int (fx)^m (d + ex^r)^3 (a + b\log(cx^n)) \, dx = \text{Too large to display}$$

input
```
integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
(((b*e^3*m^7 + 7*b*e^3*m^6 + 21*b*e^3*m^5 + 35*b*e^3*m^4 + 35*b*e^3*m^3 +
21*b*e^3*m^2 + 12*(b*e^3*m^2 + 2*b*e^3*m + b*e^3)*r^5 + 7*b*e^3*m + 40*(b*
e^3*m^3 + 3*b*e^3*m^2 + 3*b*e^3*m + b*e^3)*r^4 + b*e^3 + 51*(b*e^3*m^4 + 4
*b*e^3*m^3 + 6*b*e^3*m^2 + 4*b*e^3*m + b*e^3)*r^3 + 31*(b*e^3*m^5 + 5*b*e^
3*m^4 + 10*b*e^3*m^3 + 10*b*e^3*m^2 + 5*b*e^3*m + b*e^3)*r^2 + 9*(b*e^3*m^
6 + 6*b*e^3*m^5 + 15*b*e^3*m^4 + 20*b*e^3*m^3 + 15*b*e^3*m^2 + 6*b*e^3*m +
 b*e^3)*r)*x*log(c) + (12*(b*e^3*m^2 + 2*b*e^3*m + b*e^3)*n*r^5 + 40*(b*e^
3*m^3 + 3*b*e^3*m^2 + 3*b*e^3*m + b*e^3)*n*r^4 + 51*(b*e^3*m^4 + 4*b*e^3*m
^3 + 6*b*e^3*m^2 + 4*b*e^3*m + b*e^3)*n*r^3 + 31*(b*e^3*m^5 + 5*b*e^3*m^4
+ 10*b*e^3*m^3 + 10*b*e^3*m^2 + 5*b*e^3*m + b*e^3)*n*r^2 + 9*(b*e^3*m^6 +
6*b*e^3*m^5 + 15*b*e^3*m^4 + 20*b*e^3*m^3 + 15*b*e^3*m^2 + 6*b*e^3*m + b*e
^3)*n*r + (b*e^3*m^7 + 7*b*e^3*m^6 + 21*b*e^3*m^5 + 35*b*e^3*m^4 + 35*b*e^
3*m^3 + 21*b*e^3*m^2 + 7*b*e^3*m + b*e^3)*n)*x*log(x) + (a*e^3*m^7 + 7*a*e
^3*m^6 + 21*a*e^3*m^5 + 35*a*e^3*m^4 + 35*a*e^3*m^3 + 21*a*e^3*m^2 + 12*(a
*e^3*m^2 + 2*a*e^3*m + a*e^3)*r^5 + 7*a*e^3*m + 4*(10*a*e^3*m^3 + 30*a*e^3
*m^2 + 30*a*e^3*m + 10*a*e^3 - (b*e^3*m^2 + 2*b*e^3*m + b*e^3)*n)*r^4 + a*
e^3 + 3*(17*a*e^3*m^4 + 68*a*e^3*m^3 + 102*a*e^3*m^2 + 68*a*e^3*m + 17*a*e
^3 - 4*(b*e^3*m^3 + 3*b*e^3*m^2 + 3*b*e^3*m + b*e^3)*n)*r^3 + (31*a*e^3*m^
5 + 155*a*e^3*m^4 + 310*a*e^3*m^3 + 310*a*e^3*m^2 + 155*a*e^3*m + 31*a*e^3
 - 13*(b*e^3*m^4 + 4*b*e^3*m^3 + 6*b*e^3*m^2 + 4*b*e^3*m + b*e^3)*n)*r^...
```

3.440.6 Sympy [F(-2)]

Exception generated.

$$\int (fx)^m (d + ex^r)^3 (a + b\log(cx^n)) \, dx = \text{Exception raised: TypeError}$$

input
```
integrate((f*x)**m*(d+e*x**r)**3*(a+b*ln(c*x**n)),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

3.440.7 Maxima [A] (verification not implemented)

Time = 0.21 (sec) , antiderivative size = 343, normalized size of antiderivative = 1.47

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx = \frac{be^3f^mxe^{(m\log(x)+3r\log(x))}\log(cx^n)}{m+3r+1} + \frac{3bde^2f^mxe^{(m\log(x)+2r\log(x))}\log(cx^n)}{m+2r+1} + \frac{3bd^2ef^mxe^{(m\log(x)+r\log(x))}\log(cx^n)}{m+r+1} - \frac{bd^3f^mnxx^m}{(m+1)^2} + \frac{ae^3f^mxe^{(m\log(x)+3r\log(x))}}{m+3r+1} - \frac{be^3f^mnxe^{(m\log(x)+3r\log(x))}}{(m+3r+1)^2} + \frac{3ade^2f^mxe^{(m\log(x)+2r\log(x))}}{m+2r+1} - \frac{3bde^2f^mnxe^{(m\log(x)+2r\log(x))}}{(m+2r+1)^2} + \frac{3ad^2ef^mxe^{(m\log(x)+r\log(x))}}{m+r+1} - \frac{3bd^2ef^mnxe^{(m\log(x)+r\log(x))}}{(m+r+1)^2} + \frac{(fx)^{m+1}bd^3\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}ad^3}{f(m+1)}$$

input
```
integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e^3*f^m*x*e^(m*log(x) + 3*r*log(x))*log(c*x^n)/(m + 3*r + 1) + 3*b*d*e^2
*f^m*x*e^(m*log(x) + 2*r*log(x))*log(c*x^n)/(m + 2*r + 1) + 3*b*d^2*e*f^m*
x*e^(m*log(x) + r*log(x))*log(c*x^n)/(m + r + 1) - b*d^3*f^m*n*x*x^m/(m +
1)^2 + a*e^3*f^m*x*e^(m*log(x) + 3*r*log(x))/(m + 3*r + 1) - b*e^3*f^m*n*x
*e^(m*log(x) + 3*r*log(x))/(m + 3*r + 1)^2 + 3*a*d*e^2*f^m*x*e^(m*log(x) +
 2*r*log(x))/(m + 2*r + 1) - 3*b*d*e^2*f^m*n*x*e^(m*log(x) + 2*r*log(x))/(
m + 2*r + 1)^2 + 3*a*d^2*e*f^m*x*e^(m*log(x) + r*log(x))/(m + r + 1) - 3*b
*d^2*e*f^m*n*x*e^(m*log(x) + r*log(x))/(m + r + 1)^2 + (f*x)^(m + 1)*b*d^3
*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d^3/(f*(m + 1))
```

3.440.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 772 vs. $2(233) = 466$.

Time = 0.37 (sec) , antiderivative size = 772, normalized size of antiderivative = 3.31

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx = \frac{be^3f^mmnxx^mx^{3r}\log(x)}{m^2+6mr+9r^2+2m+6r+1} + \frac{3be^3f^mnrxx^mx^{3r}\log(x)}{m^2+6mr+9r^2+2m+6r+1} + \frac{3bde^2f^mmnxx^mx^{2r}\log(x)}{m^2+4mr+4r^2+2m+4r+1} + \frac{6bde^2f^mnrxx^mx^{2r}\log(x)}{m^2+4mr+4r^2+2m+4r+1} + \frac{3bd^2ef^mmnxx^mx^r\log(x)}{m^2+2mr+r^2+2m+2r+1} + \frac{3bd^2ef^mnrxx^mx^r\log(x)}{m^2+2mr+r^2+2m+2r+1} + \frac{bd^3f^mmnxx^m\log(x)}{m^2+2m+1} + \frac{be^3f^mnxx^mx^{3r}\log(x)}{m^2+6mr+9r^2+2m+6r+1} + \frac{3bde^2f^mnxx^mx^{2r}\log(x)}{m^2+4mr+4r^2+2m+4r+1} + \frac{3bd^2ef^mnxx^mx^r\log(x)}{m^2+2mr+r^2+2m+2r+1} - \frac{be^3f^mnxx^mx^{3r}}{m^2+6mr+9r^2+2m+6r+1} - \frac{3bde^2f^mnxx^mx^{2r}}{m^2+4mr+4r^2+2m+4r+1} - \frac{3bd^2ef^mnxx^mx^r}{m^2+2mr+r^2+2m+2r+1} + \frac{be^3f^mxx^mx^{3r}\log(c)}{m+3r+1} + \frac{3bde^2f^mxx^mx^{2r}\log(c)}{m+2r+1} + \frac{3bd^2ef^mxx^mx^r\log(c)}{m+r+1} + \frac{bd^3f^mnxx^m\log(x)}{m^2+2m+1} - \frac{bd^3f^mnxx^m}{m^2+2m+1} + \frac{ae^3f^mxx^mx^{3r}}{m+3r+1} + \frac{3ade^2f^mxx^mx^{2r}}{m+2r+1} + \frac{3ad^2ef^mxx^mx^r}{m+r+1} + \frac{(fx)^mbd^3x\log(c)}{m+1} + \frac{(fx)^mad^3x}{m+1}$$

input
```
integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e^3*f^m*m*n*x*x^m*x^(3*r)*log(x)/(m^2 + 6*m*r + 9*r^2 + 2*m + 6*r + 1) +
 3*b*e^3*f^m*n*r*x*x^m*x^(3*r)*log(x)/(m^2 + 6*m*r + 9*r^2 + 2*m + 6*r + 1
) + 3*b*d*e^2*f^m*m*n*x*x^m*x^(2*r)*log(x)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*
r + 1) + 6*b*d*e^2*f^m*n*r*x*x^m*x^(2*r)*log(x)/(m^2 + 4*m*r + 4*r^2 + 2*m
 + 4*r + 1) + 3*b*d^2*e*f^m*m*n*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m
+ 2*r + 1) + 3*b*d^2*e*f^m*n*r*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m +
 2*r + 1) + b*d^3*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*e^3*f^m*n*x*x^m
*x^(3*r)*log(x)/(m^2 + 6*m*r + 9*r^2 + 2*m + 6*r + 1) + 3*b*d*e^2*f^m*n*x*
x^m*x^(2*r)*log(x)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) + 3*b*d^2*e*f^m*n
*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) - b*e^3*f^m*n*x*x^m*
x^(3*r)/(m^2 + 6*m*r + 9*r^2 + 2*m + 6*r + 1) - 3*b*d*e^2*f^m*n*x*x^m*x^(2
*r)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) - 3*b*d^2*e*f^m*n*x*x^m*x^r/(m^2
 + 2*m*r + r^2 + 2*m + 2*r + 1) + b*e^3*f^m*x*x^m*x^(3*r)*log(c)/(m + 3*r
+ 1) + 3*b*d*e^2*f^m*x*x^m*x^(2*r)*log(c)/(m + 2*r + 1) + 3*b*d^2*e*f^m*x*
x^m*x^r*log(c)/(m + r + 1) + b*d^3*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1) - b*
d^3*f^m*n*x*x^m/(m^2 + 2*m + 1) + a*e^3*f^m*x*x^m*x^(3*r)/(m + 3*r + 1) +
3*a*d*e^2*f^m*x*x^m*x^(2*r)/(m + 2*r + 1) + 3*a*d^2*e*f^m*x*x^m*x^r/(m + r
 + 1) + (f*x)^m*b*d^3*x*log(c)/(m + 1) + (f*x)^m*a*d^3*x/(m + 1)
```

3.440.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))\,dx = \int (f\,x)^m\,(d+e\,x^r)^3\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((f*x)^m*(d + e*x^r)^3*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(d + e*x^r)^3*(a + b*log(c*x^n)), x)
```

3.441 $\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n)) \, dx$

3.441.1 Optimal result

Integrand size = 25, antiderivative size = 165

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n)) \, dx = -\frac{2bdenx^{1+r}(fx)^m}{(1+m+r)^2} - \frac{be^2nx^{1+2r}(fx)^m}{(1+m+2r)^2} - \frac{bd^2n(fx)^{1+m}}{f(1+m)^2} + \frac{2dex^{1+r}(fx)^m(a+b\log(cx^n))}{1+m+r} + \frac{e^2x^{1+2r}(fx)^m(a+b\log(cx^n))}{1+m+2r} + \frac{d^2(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}$$

output

```
-2*b*d*e*n*x^(1+r)*(f*x)^m/(1+m+r)^2-b*e^2*n*x^(1+2*r)*(f*x)^m/(1+m+2*r)^2
-b*d^2*n*(f*x)^(1+m)/f/(1+m)^2+2*d*e*x^(1+r)*(f*x)^m*(a+b*ln(c*x^n))/(1+m+
r)+e^2*x^(1+2*r)*(f*x)^m*(a+b*ln(c*x^n))/(1+m+2*r)+d^2*(f*x)^(1+m)*(a+b*ln
(c*x^n))/f/(1+m)
```

3.441.2 Mathematica [A] (verified)

Time = 0.17 (sec) , antiderivative size = 124, normalized size of antiderivative = 0.75

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n)) \, dx = x(fx)^m \left(-\frac{bd^2n}{(1+m)^2} - \frac{2bdenx^r}{(1+m+r)^2} - \frac{be^2nx^{2r}}{(1+m+2r)^2} + \frac{d^2(a+b\log(cx^n))}{1+m} + \frac{2dex^r(a+b\log(cx^n))}{1+m+r} + \frac{e^2x^{2r}(a+b\log(cx^n))}{1+m+2r}\right)$$

input
```
Integrate[(f*x)^m*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d^2*n)/(1 + m)^2) - (2*b*d*e*n*x^r)/(1 + m + r)^2 - (b*e^2
*n*x^(2*r))/(1 + m + 2*r)^2 + (d^2*(a + b*Log[c*x^n]))/(1 + m) + (2*d*e*x^
r*(a + b*Log[c*x^n]))/(1 + m + r) + (e^2*x^(2*r)*(a + b*Log[c*x^n]))/(1 +
m + 2*r))
```

3.441.3 Rubi [A] (verified)

Time = 0.44 (sec) , antiderivative size = 162, normalized size of antiderivative = 0.98, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2792, 1691, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2792}$$

$$-bn\int (fx)^m\left(\frac{2dex^r}{m+r+1}+\frac{e^2x^{2r}}{m+2r+1}+\frac{d^2}{m+1}\right)dx+\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2dex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}+\frac{e^2x^{2r+1}(fx)^m(a+b\log(cx^n))}{m+2r+1}$$

$$\Big\downarrow \text{1691}$$

$$-bn\int \left(\frac{2dex^r(fx)^m}{m+r+1}+\frac{e^2x^{2r}(fx)^m}{m+2r+1}+\frac{d^2(fx)^m}{m+1}\right)dx+\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2dex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}+\frac{e^2x^{2r+1}(fx)^m(a+b\log(cx^n))}{m+2r+1}$$

$$\Big\downarrow \text{2009}$$

$$\frac{d^2(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{2dex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}+\frac{e^2x^{2r+1}(fx)^m(a+b\log(cx^n))}{m+2r+1}-bn\left(\frac{d^2(fx)^{m+1}}{f(m+1)^2}+\frac{2dex^{r+1}(fx)^m}{(m+r+1)^2}+\frac{e^2x^{2r+1}(fx)^m}{(m+2r+1)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x^r)^2*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((2*d*e*x^(1 + r)*(f*x)^m)/(1 + m + r)^2 + (e^2*x^(1 + 2*r)*(f*x)^m)
/(1 + m + 2*r)^2 + (d^2*(f*x)^(1 + m))/(f*(1 + m)^2))) + (2*d*e*x^(1 + r)*
(f*x)^m*(a + b*Log[c*x^n]))/(1 + m + r) + (e^2*x^(1 + 2*r)*(f*x)^m*(a + b*
Log[c*x^n]))/(1 + m + 2*r) + (d^2*(f*x)^(1 + m)*(a + b*Log[c*x^n]))/(f*(1
+ m))
```

3.441.3.1 Defintions of rubi rules used

rule 1691
```
Int[((d_.)*(x_))^(m_.)*((a_) + (c_.)*(x_)^(n2_.) + (b_.)*(x_)^(n_))^(p_.),
x_Symbol] :> Int[ExpandIntegrand[(d*x)^m*(a + b*x^n + c*x^(2*n))^p, x], x]
/; FreeQ[{a, b, c, d, m, n}, x] && EqQ[n2, 2*n] && IGtQ[p, 0] &&  !IntegerQ
[Simplify[(m + 1)/n]]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.441.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 3058 vs. $2(165) = 330$.

Time = 13.00 (sec) , antiderivative size = 3059, normalized size of antiderivative = 18.54

method	result	size
parallelrisch	Expression too large to display	3059
risch	Expression too large to display	8671

input
```
int((f*x)^m*(d+e*x^r)^2*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-39*x*(f*x)^m*a*d^2*m*r^2+13*x*(f*x)^m*b*d^2*n*r^2+4*x*(f*x)^m*b*d^2*n*r
^4-10*x*(x^r)^2*(f*x)^m*a*e^2*m^2-5*x*(x^r)^2*(f*x)^m*a*e^2*r^2-12*x*(f*x)
^m*ln(c*x^n)*b*d^2*r^3-24*x*(f*x)^m*a*d^2*m^3*r-39*x*(f*x)^m*a*d^2*m^2*r^2
-e^2*b*ln(c*x^n)*(f*x)^m*(x^r)^2*x-10*x*(x^r)^2*(f*x)^m*a*e^2*m^3-5*x*(x^r
)^2*(f*x)^m*a*e^2*m-6*x*(f*x)^m*ln(c*x^n)*b*d^2*r-24*x*(f*x)^m*a*d^2*m*r-x
*(f*x)^m*a*d^2-15*x*(x^r)^2*(f*x)^m*a*e^2*m^2*r^2-4*x*(x^r)^2*(f*x)^m*a*e^
2*m*r^3-2*b*d*e*ln(c*x^n)*(f*x)^m*x^r*x-x*(x^r)^2*(f*x)^m*ln(c*x^n)*b*e^2*
m^5-10*x*(x^r)^2*(f*x)^m*ln(c*x^n)*b*e^2*m^3-2*x*(x^r)^2*(f*x)^m*ln(c*x^n)
*b*e^2*r^3-16*x*(x^r)^2*(f*x)^m*a*e^2*m^3*r-5*x*(x^r)^2*(f*x)^m*a*e^2*m^3*
r^2-24*x*(f*x)^m*a*d^2*m*r^3-36*x*(f*x)^m*ln(c*x^n)*b*d^2*m^2*r-39*x*(f*x)
^m*ln(c*x^n)*b*d^2*m*r^2+18*x*(f*x)^m*b*d^2*m^2*n*r+26*x*(f*x)^m*b*d^2*m*n
*r^2-20*x*x^r*(f*x)^m*a*d*e*m^2-16*x*x^r*(f*x)^m*a*d*e*r^2-24*x*(f*x)^m*ln
(c*x^n)*b*d^2*m*r+18*x*(f*x)^m*b*d^2*m*n*r-10*x*x^r*(f*x)^m*a*d*e*m-10*x*x
^r*(f*x)^m*a*d*e*r+2*x*x^r*(f*x)^m*b*d*e*n-2*x*(x^r)^2*(f*x)^m*a*e^2*r^3-4
*x*(f*x)^m*ln(c*x^n)*b*d^2*r^4-6*x*(f*x)^m*a*d^2*m^4*r-13*x*(f*x)^m*a*d^2*
m^3*r^2-12*x*(f*x)^m*a*d^2*m^2*r^3-4*x*(f*x)^m*a*d^2*m*r^4+12*x*(f*x)^m*b*
d^2*m*n*r^3-5*x*(x^r)^2*(f*x)^m*ln(c*x^n)*b*e^2*m-4*x*(x^r)^2*(f*x)^m*ln(c
*x^n)*b*e^2*r+12*x*(f*x)^m*b*d^2*n*r^3-16*x*(x^r)^2*(f*x)^m*a*e^2*m*r+4*x*
(x^r)^2*(f*x)^m*b*e^2*m*n+2*x*(x^r)^2*(f*x)^m*b*e^2*n*r-20*x*x^r*(f*x)^m*a
*d*e*m^3-8*x*x^r*(f*x)^m*a*d*e*r^3-2*x*(x^r)^2*(f*x)^m*a*e^2*m^2*r^3+x*...
```

3.441.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 1875 vs. $2(165) = 330$.

Time = 0.34 (sec) , antiderivative size = 1875, normalized size of antiderivative = 11.36

$$\int (fx)^m (d + ex^r)^2 (a + b\log(cx^n)) \, dx = \text{Too large to display}$$

input
```
integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
(((b*e^2*m^5 + 5*b*e^2*m^4 + 10*b*e^2*m^3 + 10*b*e^2*m^2 + 5*b*e^2*m + 2*(
b*e^2*m^2 + 2*b*e^2*m + b*e^2)*r^3 + b*e^2 + 5*(b*e^2*m^3 + 3*b*e^2*m^2 +
3*b*e^2*m + b*e^2)*r^2 + 4*(b*e^2*m^4 + 4*b*e^2*m^3 + 6*b*e^2*m^2 + 4*b*e^
2*m + b*e^2)*r)*x*log(c) + (2*(b*e^2*m^2 + 2*b*e^2*m + b*e^2)*n*r^3 + 5*(b
*e^2*m^3 + 3*b*e^2*m^2 + 3*b*e^2*m + b*e^2)*n*r^2 + 4*(b*e^2*m^4 + 4*b*e^2
*m^3 + 6*b*e^2*m^2 + 4*b*e^2*m + b*e^2)*n*r + (b*e^2*m^5 + 5*b*e^2*m^4 + 1
0*b*e^2*m^3 + 10*b*e^2*m^2 + 5*b*e^2*m + b*e^2)*n)*x*log(x) + (a*e^2*m^5 +
 5*a*e^2*m^4 + 10*a*e^2*m^3 + 10*a*e^2*m^2 + 5*a*e^2*m + 2*(a*e^2*m^2 + 2*
a*e^2*m + a*e^2)*r^3 + a*e^2 + (5*a*e^2*m^3 + 15*a*e^2*m^2 + 15*a*e^2*m +
5*a*e^2 - (b*e^2*m^2 + 2*b*e^2*m + b*e^2)*n)*r^2 - (b*e^2*m^4 + 4*b*e^2*m^
3 + 6*b*e^2*m^2 + 4*b*e^2*m + b*e^2)*n + 2*(2*a*e^2*m^4 + 8*a*e^2*m^3 + 12
*a*e^2*m^2 + 8*a*e^2*m + 2*a*e^2 - (b*e^2*m^3 + 3*b*e^2*m^2 + 3*b*e^2*m +
b*e^2)*n)*r)*x)*x^(2*r)*e^(m*log(f) + m*log(x)) + 2*((b*d*e*m^5 + 5*b*d*e*
m^4 + 10*b*d*e*m^3 + 10*b*d*e*m^2 + 5*b*d*e*m + 4*(b*d*e*m^2 + 2*b*d*e*m +
 b*d*e)*r^3 + b*d*e + 8*(b*d*e*m^3 + 3*b*d*e*m^2 + 3*b*d*e*m + b*d*e)*r^2
+ 5*(b*d*e*m^4 + 4*b*d*e*m^3 + 6*b*d*e*m^2 + 4*b*d*e*m + b*d*e)*r)*x*log(c
) + (4*(b*d*e*m^2 + 2*b*d*e*m + b*d*e)*n*r^3 + 8*(b*d*e*m^3 + 3*b*d*e*m^2
+ 3*b*d*e*m + b*d*e)*n*r^2 + 5*(b*d*e*m^4 + 4*b*d*e*m^3 + 6*b*d*e*m^2 + 4*
b*d*e*m + b*d*e)*n*r + (b*d*e*m^5 + 5*b*d*e*m^4 + 10*b*d*e*m^3 + 10*b*d*e*
m^2 + 5*b*d*e*m + b*d*e)*n)*x*log(x) + (a*d*e*m^5 + 5*a*d*e*m^4 + 10*a*...
```

3.441.6 Sympy [F(-2)]

Exception generated.

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n)) \, dx = \text{Exception raised: TypeError}$$

input
```
integrate((f*x)**m*(d+e*x**r)**2*(a+b*ln(c*x**n)),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

3.441.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 240, normalized size of antiderivative = 1.45

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx = \frac{be^2f^mxe^{(m\log(x)+2r\log(x))}\log(cx^n)}{m+2r+1} + \frac{2\,bdef^mxe^{(m\log(x)+r\log(x))}\log(cx^n)}{m+r+1} - \frac{bd^2f^mnxx^m}{(m+1)^2} + \frac{ae^2f^mxe^{(m\log(x)+2r\log(x))}}{m+2r+1} - \frac{be^2f^mnxe^{(m\log(x)+2r\log(x))}}{(m+2r+1)^2} + \frac{2\,adef^mxe^{(m\log(x)+r\log(x))}}{m+r+1} - \frac{2\,bdef^mnxe^{(m\log(x)+r\log(x))}}{(m+r+1)^2} + \frac{(fx)^{m+1}bd^2\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}ad^2}{f(m+1)}$$

input
```
integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e^2*f^m*x*e^(m*log(x) + 2*r*log(x))*log(c*x^n)/(m + 2*r + 1) + 2*b*d*e*f
^m*x*e^(m*log(x) + r*log(x))*log(c*x^n)/(m + r + 1) - b*d^2*f^m*n*x*x^m/(m
 + 1)^2 + a*e^2*f^m*x*e^(m*log(x) + 2*r*log(x))/(m + 2*r + 1) - b*e^2*f^m*
n*x*e^(m*log(x) + 2*r*log(x))/(m + 2*r + 1)^2 + 2*a*d*e*f^m*x*e^(m*log(x)
+ r*log(x))/(m + r + 1) - 2*b*d*e*f^m*n*x*e^(m*log(x) + r*log(x))/(m + r +
 1)^2 + (f*x)^(m + 1)*b*d^2*log(c*x^n)/(f*(m + 1)) + (f*x)^(m + 1)*a*d^2/(
f*(m + 1))
```

3.441.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 528 vs. 2(165) = 330.

Time = 0.37 (sec) , antiderivative size = 528, normalized size of antiderivative = 3.20

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx = \frac{be^2f^mmnxx^mx^{2r}\log(x)}{m^2+4mr+4r^2+2m+4r+1} + \frac{2be^2f^mnrxx^mx^{2r}\log(x)}{m^2+4mr+4r^2+2m+4r+1} + \frac{2bdef^mmnxx^mx^r\log(x)}{m^2+2mr+r^2+2m+2r+1} + \frac{2bdef^mnrxx^mx^r\log(x)}{m^2+2mr+r^2+2m+2r+1} + \frac{bd^2f^mmnxx^m\log(x)}{m^2+2m+1} + \frac{be^2f^mnxx^mx^{2r}\log(x)}{m^2+4mr+4r^2+2m+4r+1} + \frac{2bdef^mnxx^mx^r\log(x)}{m^2+2mr+r^2+2m+2r+1} - \frac{be^2f^mnxx^mx^{2r}}{m^2+4mr+4r^2+2m+4r+1} - \frac{2bdef^mnxx^mx^r}{m^2+2mr+r^2+2m+2r+1} + \frac{be^2f^mxx^mx^{2r}\log(c)}{m+2r+1} + \frac{2bdef^mxx^mx^r\log(c)}{m+r+1} + \frac{bd^2f^mnxx^m\log(x)}{m^2+2m+1} - \frac{bd^2f^mnxx^m}{m^2+2m+1} + \frac{ae^2f^mxx^mx^{2r}}{m+2r+1} + \frac{2adef^mxx^mx^r}{m+r+1} + \frac{(fx)^m bd^2x\log(c)}{m+1} + \frac{(fx)^m ad^2x}{m+1}$$

input
```
integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e^2*f^m*m*n*x*x^m*x^(2*r)*log(x)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) +
 2*b*e^2*f^m*n*r*x*x^m*x^(2*r)*log(x)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1
) + 2*b*d*e*f^m*m*n*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) +
 2*b*d*e*f^m*n*r*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) + b*
d^2*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*e^2*f^m*n*x*x^m*x^(2*r)*log(x
)/(m^2 + 4*m*r + 4*r^2 + 2*m + 4*r + 1) + 2*b*d*e*f^m*n*x*x^m*x^r*log(x)/(
m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) - b*e^2*f^m*n*x*x^m*x^(2*r)/(m^2 + 4*m*
r + 4*r^2 + 2*m + 4*r + 1) - 2*b*d*e*f^m*n*x*x^m*x^r/(m^2 + 2*m*r + r^2 +
2*m + 2*r + 1) + b*e^2*f^m*x*x^m*x^(2*r)*log(c)/(m + 2*r + 1) + 2*b*d*e*f^
m*x*x^m*x^r*log(c)/(m + r + 1) + b*d^2*f^m*n*x*x^m*log(x)/(m^2 + 2*m + 1)
- b*d^2*f^m*n*x*x^m/(m^2 + 2*m + 1) + a*e^2*f^m*x*x^m*x^(2*r)/(m + 2*r + 1
) + 2*a*d*e*f^m*x*x^m*x^r/(m + r + 1) + (f*x)^m*b*d^2*x*log(c)/(m + 1) + (
f*x)^m*a*d^2*x/(m + 1)
```

3.441. $\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx$

3.441.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))\,dx = \int (f\,x)^m\,(d+e\,x^r)^2\,(a+b\,\ln(c\,x^n))\,dx$$

input
```
int((f*x)^m*(d + e*x^r)^2*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(d + e*x^r)^2*(a + b*log(c*x^n)), x)
```

3.442 $\int (fx)^m (d + ex^r) (a + b \log (cx^n)) \, dx$

3.442.1 Optimal result

Integrand size = 23, antiderivative size = 97

$$\int (fx)^m (d + ex^r) (a + b \log (cx^n)) \, dx = -\frac{benx^{1+r}(fx)^m}{(1+m+r)^2} - \frac{bdn(fx)^{1+m}}{f(1+m)^2} + \frac{ex^{1+r}(fx)^m (a + b \log (cx^n))}{1+m+r} + \frac{d(fx)^{1+m} (a + b \log (cx^n))}{f(1+m)}$$

output
```
-b*e*n*x^(1+r)*(f*x)^m/(1+m+r)^2-b*d*n*(f*x)^(1+m)/f/(1+m)^2+e*x^(1+r)*(f*
x)^m*(a+b*ln(c*x^n))/(1+m+r)+d*(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)
```

3.442.2 Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 70, normalized size of antiderivative = 0.72

$$\int (fx)^m (d + ex^r) (a + b \log (cx^n)) \, dx = x(fx)^m \left(-\frac{bdn}{(1+m)^2} - \frac{benx^r}{(1+m+r)^2} + \frac{d(a + b \log (cx^n))}{1+m} + \frac{ex^r(a + b \log (cx^n))}{1+m+r} \right)$$

input
```
Integrate[(f*x)^m*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
x*(f*x)^m*(-((b*d*n)/(1 + m)^2) - (b*e*n*x^r)/(1 + m + r)^2 + (d*(a + b*Lo
g[c*x^n]))/(1 + m) + (e*x^r*(a + b*Log[c*x^n]))/(1 + m + r))
```

3.442.3 Rubi [A] (verified)

Time = 0.31 (sec) , antiderivative size = 96, normalized size of antiderivative = 0.99, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.130, Rules used = {2792, 802, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n)) \, dx$$

$$\Big\downarrow \; 2792$$

$$-bn\int (fx)^m \left(\frac{ex^r}{m+r+1}+\frac{d}{m+1}\right)dx+\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{ex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}$$

$$\Big\downarrow \; 802$$

$$-bn\int \left(\frac{ex^r(fx)^m}{m+r+1}+\frac{d(fx)^m}{m+1}\right)dx+\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{ex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}$$

$$\Big\downarrow \; 2009$$

$$\frac{d(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}+\frac{ex^{r+1}(fx)^m(a+b\log(cx^n))}{m+r+1}-bn\left(\frac{d(fx)^{m+1}}{f(m+1)^2}+\frac{ex^{r+1}(fx)^m}{(m+r+1)^2}\right)$$

input
```
Int[(f*x)^m*(d + e*x^r)*(a + b*Log[c*x^n]),x]
```

output
```
-(b*n*((e*x^(1 + r)*(f*x)^m)/(1 + m + r)^2 + (d*(f*x)^(1 + m))/(f*(1 + m)^
2))) + (e*x^(1 + r)*(f*x)^m*(a + b*Log[c*x^n]))/(1 + m + r) + (d*(f*x)^(1
+ m)*(a + b*Log[c*x^n]))/(f*(1 + m))
```

3.442.3.1 Defintions of rubi rules used

rule 802
```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_.), x_Symbol] :> Int[Exp
andIntegrand[(c*x)^m*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, c, m, n}, x] &&
IGtQ[p, 0]
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2792
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = IntHide[(f*x)^m*(d + e*x^r)^q, x]
}, Simp[(a + b*Log[c*x^n])   u, x] - Simp[b*n   Int[SimplifyIntegrand[u/x,
x], x], x] /; ((EqQ[r, 1] || EqQ[r, 2]) && IntegerQ[m] && IntegerQ[q - 1/2]
) || InverseFunctionFreeQ[u, x]] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x
] && IntegerQ[2*q] && ((IntegerQ[m] && IntegerQ[r]) || IGtQ[q, 0])
```

3.442.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 659 vs. $2(97) = 194$.

Time = 1.92 (sec) , antiderivative size = 660, normalized size of antiderivative = 6.80

method	result
parallelrisch	$-\frac{-x(fx)^m ad-x(fx)^m ad\, m^3-3x(fx)^m ad\, m^2-3x(fx)^m adm+x(fx)^m bdn-x(fx)^m \ln(c\,x^n)bd-x(fx)^m \ln(c\,x^n)bd\, m^3-3x(\ldots}{}$
risch	Expression too large to display

input
```
int((f*x)^m*(d+e*x^r)*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-x*(f*x)^m*a*d-x*(f*x)^m*a*d*m^3-3*x*(f*x)^m*a*d*m^2-3*x*(f*x)^m*a*d*m+x
*(f*x)^m*b*d*n-x*(f*x)^m*ln(c*x^n)*b*d-x*(f*x)^m*ln(c*x^n)*b*d*m^3-3*x*(f*
x)^m*ln(c*x^n)*b*d*m^2+x*(f*x)^m*b*d*m^2*n-3*x*(f*x)^m*ln(c*x^n)*b*d*m+2*x
*(f*x)^m*b*d*m*n-2*x*x^r*(f*x)^m*ln(c*x^n)*b*e*m*r-x*x^r*(f*x)^m*ln(c*x^n)
*b*e*m^2*r-x*x^r*(f*x)^m*ln(c*x^n)*b*e*m^3-3*x*x^r*(f*x)^m*ln(c*x^n)*b*e*m
^2-x*x^r*(f*x)^m*a*e*m^2*r+x*x^r*(f*x)^m*b*e*m^2*n-2*x*(f*x)^m*ln(c*x^n)*b
*d*m^2*r-x*(f*x)^m*ln(c*x^n)*b*d*m*r^2-3*x*x^r*(f*x)^m*ln(c*x^n)*b*e*m-x*x
^r*(f*x)^m*ln(c*x^n)*b*e*r-2*x*x^r*(f*x)^m*a*e*m*r+2*x*x^r*(f*x)^m*b*e*m*n
-4*x*(f*x)^m*ln(c*x^n)*b*d*m*r+2*x*(f*x)^m*b*d*m*n*r-x*(f*x)^m*a*d*r^2-x*x
^r*(f*x)^m*a*e-2*x*(f*x)^m*a*d*r-x*x^r*(f*x)^m*ln(c*x^n)*b*e-x*x^r*(f*x)^m
*a*e*m^3-3*x*x^r*(f*x)^m*a*e*m^2-x*(f*x)^m*ln(c*x^n)*b*d*r^2-2*x*(f*x)^m*a
*d*m^2*r-x*(f*x)^m*a*d*m*r^2+x*(f*x)^m*b*d*n*r^2-3*x*x^r*(f*x)^m*a*e*m-x*x
^r*(f*x)^m*a*e*r+x*x^r*(f*x)^m*b*e*n-2*x*(f*x)^m*ln(c*x^n)*b*d*r-4*x*(f*x)
^m*a*d*m*r+2*x*(f*x)^m*b*d*n*r)/(1+m)^2/(1+m+r)^2
```

3.442.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 431 vs. $2(97) = 194$.

Time = 0.28 (sec) , antiderivative size = 431, normalized size of antiderivative = 4.44

$$\int (fx)^m (d + ex^r) (a + b\log(cx^n)) \, dx$$
$$= \frac{((bem^3 + 3\,bem^2 + 3\,bem + be + (bem^2 + 2\,bem + be)r)x\log(c) + ((bem^2 + 2\,bem + be)nr + (bem^3 + 3\,b$$

input
```
integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
(((b*e*m^3 + 3*b*e*m^2 + 3*b*e*m + b*e + (b*e*m^2 + 2*b*e*m + b*e)*r)*x*lo
g(c) + ((b*e*m^2 + 2*b*e*m + b*e)*n*r + (b*e*m^3 + 3*b*e*m^2 + 3*b*e*m + b
*e)*n)*x*log(x) + (a*e*m^3 + 3*a*e*m^2 + 3*a*e*m + a*e - (b*e*m^2 + 2*b*e*
m + b*e)*n + (a*e*m^2 + 2*a*e*m + a*e)*r)*x)*x^r*e^(m*log(f) + m*log(x)) +
 ((b*d*m^3 + 3*b*d*m^2 + 3*b*d*m + (b*d*m + b*d)*r^2 + b*d + 2*(b*d*m^2 +
2*b*d*m + b*d)*r)*x*log(c) + ((b*d*m + b*d)*n*r^2 + 2*(b*d*m^2 + 2*b*d*m +
 b*d)*n*r + (b*d*m^3 + 3*b*d*m^2 + 3*b*d*m + b*d)*n)*x*log(x) + (a*d*m^3 +
 3*a*d*m^2 + 3*a*d*m + (a*d*m - b*d*n + a*d)*r^2 + a*d - (b*d*m^2 + 2*b*d*
m + b*d)*n + 2*(a*d*m^2 + 2*a*d*m + a*d - (b*d*m + b*d)*n)*r)*x)*e^(m*log(
f) + m*log(x)))/(m^4 + 4*m^3 + (m^2 + 2*m + 1)*r^2 + 6*m^2 + 2*(m^3 + 3*m^
2 + 3*m + 1)*r + 4*m + 1)
```

3.442.6 Sympy [F(-2)]

Exception generated.

$$\int (fx)^m (d + ex^r) (a + b\log(cx^n)) \, dx = \text{Exception raised: TypeError}$$

input
```
integrate((f*x)**m*(d+e*x**r)*(a+b*ln(c*x**n)),x)
```

output
```
Exception raised: TypeError >> Invalid comparison of non-real zoo
```

3.442.7 Maxima [A] (verification not implemented)

Time = 0.20 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.41

$$\int (fx)^m (d+ex^r)(a+b\log(cx^n))\,dx = \frac{bef^m xe^{(m\log(x)+r\log(x))}\log(cx^n)}{m+r+1} - \frac{bdf^m nxx^m}{(m+1)^2} + \frac{aef^m xe^{(m\log(x)+r\log(x))}}{m+r+1} - \frac{bef^m nxe^{(m\log(x)+r\log(x))}}{(m+r+1)^2} + \frac{(fx)^{m+1}bd\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1}ad}{f(m+1)}$$

input
```
integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
b*e*f^m*x*e^(m*log(x) + r*log(x))*log(c*x^n)/(m + r + 1) - b*d*f^m*n*x*x^m
/(m + 1)^2 + a*e*f^m*x*e^(m*log(x) + r*log(x))/(m + r + 1) - b*e*f^m*n*x*e
^(m*log(x) + r*log(x))/(m + r + 1)^2 + (f*x)^(m + 1)*b*d*log(c*x^n)/(f*(m
+ 1)) + (f*x)^(m + 1)*a*d/(f*(m + 1))
```

3.442.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 285 vs. 2(97) = 194.

Time = 0.31 (sec) , antiderivative size = 285, normalized size of antiderivative = 2.94

$$\int (fx)^m (d+ex^r)(a+b\log(cx^n))\,dx = \frac{bef^m mnxx^m x^r\log(x)}{m^2+2mr+r^2+2m+2r+1} + \frac{bef^m nrxx^m x^r\log(x)}{m^2+2mr+r^2+2m+2r+1} + \frac{bdf^m mnxx^m\log(x)}{m^2+2m+1} + \frac{bef^m nxx^m x^r\log(x)}{m^2+2mr+r^2+2m+2r+1} - \frac{bef^m nxx^m x^r}{m^2+2mr+r^2+2m+2r+1} + \frac{bef^m xx^m x^r\log(c)}{m+r+1} + \frac{bdf^m nxx^m\log(x)}{m^2+2m+1} - \frac{bdf^m nxx^m}{m^2+2m+1} + \frac{aef^m xx^m x^r}{m+r+1} + \frac{(fx)^m bdx\log(c)}{m+1} + \frac{(fx)^m adx}{m+1}$$

input
```
integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*e*f^m*m*n*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) + b*e*f^m
*n*r*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1) + b*d*f^m*m*n*x*
x^m*log(x)/(m^2 + 2*m + 1) + b*e*f^m*n*x*x^m*x^r*log(x)/(m^2 + 2*m*r + r^2
 + 2*m + 2*r + 1) - b*e*f^m*n*x*x^m*x^r/(m^2 + 2*m*r + r^2 + 2*m + 2*r + 1
) + b*e*f^m*x*x^m*x^r*log(c)/(m + r + 1) + b*d*f^m*n*x*x^m*log(x)/(m^2 + 2
*m + 1) - b*d*f^m*n*x*x^m/(m^2 + 2*m + 1) + a*e*f^m*x*x^m*x^r/(m + r + 1)
+ (f*x)^m*b*d*x*log(c)/(m + 1) + (f*x)^m*a*d*x/(m + 1)
```

3.442.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d + ex^r) (a + b\log(cx^n)) \, dx = \int (f\,x)^m \, (d + e\,x^r) \, (a + b\,\ln(c\,x^n)) \, dx$$

input
```
int((f*x)^m*(d + e*x^r)*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(d + e*x^r)*(a + b*log(c*x^n)), x)
```

3.443 $\int (fx)^m (a + b\log(cx^n))\, dx$

3.443.1 Optimal result

Integrand size = 16, antiderivative size = 46

$$\int (fx)^m (a+b\log(cx^n))\, dx = -\frac{bn(fx)^{1+m}}{f(1+m)^2} + \frac{(fx)^{1+m}(a+b\log(cx^n))}{f(1+m)}$$

output
```
-b*n*(f*x)^(1+m)/f/(1+m)^2+(f*x)^(1+m)*(a+b*ln(c*x^n))/f/(1+m)
```

3.443.2 Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.70

$$\int (fx)^m (a+b\log(cx^n))\, dx = \frac{x(fx)^m(a+am-bn+b(1+m)\log(cx^n))}{(1+m)^2}$$

input
```
Integrate[(f*x)^m*(a + b*Log[c*x^n]),x]
```

output
```
(x*(f*x)^m*(a + a*m - b*n + b*(1 + m)*Log[c*x^n]))/(1 + m)^2
```

3.443.3 Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.062, Rules used = {2741}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (a+b\log(cx^n))\,dx$$

$$\Big\downarrow \; 2741$$

$$\frac{(fx)^{m+1}(a+b\log(cx^n))}{f(m+1)}-\frac{bn(fx)^{m+1}}{f(m+1)^2}$$

input
```
Int[(f*x)^m*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*(f*x)^(1 + m))/(f*(1 + m)^2)) + ((f*x)^(1 + m)*(a + b*Log[c*x^n]))/
(f*(1 + m))
```

3.443.3.1 Defintions of rubi rules used

rule 2741
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_.)*(x_))^(m_.), x_Symbol] :>
Simp[(d*x)^(m + 1)*((a + b*Log[c*x^n])/(d*(m + 1))), x] - Simp[b*n*((d*x)^(
m + 1)/(d*(m + 1)^2)), x] /; FreeQ[{a, b, c, d, m, n}, x] && NeQ[m, -1]
```

3.443.4 Maple [A] (verified)

Time = 0.08 (sec) , antiderivative size = 68, normalized size of antiderivative = 1.48

method	result
parallelrisch	$-\frac{-x(fx)^m\ln(cx^n)bm-x(fx)^m\ln(cx^n)b-x(fx)^m am+x(fx)^m bn-x(fx)^m a}{(1+m)^2}$
risch	$\frac{bx\,x^m f^m e^{\frac{i\,\text{csgn}(ifx)\pi m(\text{csgn}(ifx)-\text{csgn}(ix))(-\text{csgn}(ifx)+\text{csgn}(if))}{2}}\ln(x^n)}{1+m}-\frac{\left(i\pi b\,\text{csgn}(ic)\,\text{csgn}(ix^n)\,\text{csgn}(icx^n)m-i\pi b\,\text{csgn}(i\right.}{}$

input
```
int((f*x)^m*(a+b*ln(c*x^n)),x,method=_RETURNVERBOSE)
```

output
```
-(-x*(f*x)^m*ln(c*x^n)*b*m-x*(f*x)^m*ln(c*x^n)*b-x*(f*x)^m*a*m+x*(f*x)^m*b
*n-x*(f*x)^m*a)/(1+m)^2
```

3.443.5 Fricas [A] (verification not implemented)

Time = 0.31 (sec) , antiderivative size = 52, normalized size of antiderivative = 1.13

$$\int (fx)^m (a+b\log (cx^n))\,dx = \frac{((bm+b)nx\log (x)+(bm+b)x\log (c)+(am-bn+a)x)e^{(m\log (f)+m\log (x))}}{m^2+2\,m+1}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
((b*m + b)*n*x*log(x) + (b*m + b)*x*log(c) + (a*m - b*n + a)*x)*e^(m*log(f
) + m*log(x))/(m^2 + 2*m + 1)
```

3.443.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 141 vs. 2(37) = 74.

Time = 2.12 (sec) , antiderivative size = 141, normalized size of antiderivative = 3.07

$$\int (fx)^m (a+b\log (cx^n))\,dx = \begin{cases} \frac{amx(fx)^m}{m^2+2m+1}+\frac{ax(fx)^m}{m^2+2m+1}+\frac{bmx(fx)^m\log (cx^n)}{m^2+2m+1}-\frac{bnx(fx)^m}{m^2+2m+1}+\frac{bx(fx)^m\log (cx^n)}{m^2+2m+1} & \text{for } m\neq -1 \\ \frac{\begin{cases} a\log (x) & \text{for } b=0 \\ -(-a-b\log (c))\log (x) & \text{for } n=0 \\ \frac{(-a-b\log (cx^n))^2}{2bn} & \text{otherwise} \end{cases}}{f} & \text{otherwise} \end{cases}$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n)),x)
```

output
```
Piecewise((a*m*x*(f*x)**m/(m**2 + 2*m + 1) + a*x*(f*x)**m/(m**2 + 2*m + 1)
 + b*m*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1) - b*n*x*(f*x)**m/(m**2 + 2*
m + 1) + b*x*(f*x)**m*log(c*x**n)/(m**2 + 2*m + 1), Ne(m, -1)), (Piecewise
((a*log(x), Eq(b, 0)), (-(-a - b*log(c))*log(x), Eq(n, 0)), ((-a - b*log(c
*x**n))**2/(2*b*n), True))/f, True))
```

3.443.7 Maxima [A] (verification not implemented)

Time = 0.18 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.24

$$\int (fx)^m (a + b\log(cx^n))\, dx = -\frac{bf^m nxx^m}{(m+1)^2} + \frac{(fx)^{m+1} b\log(cx^n)}{f(m+1)} + \frac{(fx)^{m+1} a}{f(m+1)}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
-b*f^m*n*x*x^m/(m + 1)^2 + (f*x)^(m + 1)*b*log(c*x^n)/(f*(m + 1)) + (f*x)^
(m + 1)*a/(f*(m + 1))
```

3.443.8 Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. 2(46) = 92.

Time = 0.30 (sec) , antiderivative size = 95, normalized size of antiderivative = 2.07

$$\int (fx)^m (a + b\log(cx^n))\, dx = \frac{bf^m mnxx^m \log(x)}{m^2 + 2m + 1} + \frac{bf^m nxx^m \log(x)}{m^2 + 2m + 1} - \frac{bf^m nxx^m}{m^2 + 2m + 1} + \frac{(fx)^m bx\log(c)}{m+1} + \frac{(fx)^m ax}{m+1}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
b*f^m*m*n*x*x^m*log(x)/(m^2 + 2*m + 1) + b*f^m*n*x*x^m*log(x)/(m^2 + 2*m +
 1) - b*f^m*n*x*x^m/(m^2 + 2*m + 1) + (f*x)^m*b*x*log(c)/(m + 1) + (f*x)^m
*a*x/(m + 1)
```

3.443.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m (a + b\log(cx^n))\, dx = \int (f\,x)^m\, (a + b\,\ln(c\,x^n))\, dx$$

input
```
int((f*x)^m*(a + b*log(c*x^n)),x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n)), x)
```

3.444 $\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex^r} dx$

3.444.1 Optimal result

Integrand size = 25, antiderivative size = 25

$$\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex^r} dx = \text{Int}\left(\frac{(fx)^m(a+b\log(cx^n))}{d+ex^r}, x\right)$$

output
```
Unintegrable((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

3.444.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 111 vs. 2(28) = 56.

Time = 0.16 (sec) , antiderivative size = 111, normalized size of antiderivative = 4.44

$$\int \frac{(fx)^m(a+b\log(cx^n))}{d+ex^r} dx = \frac{x(fx)^m\left(-bn\,{}_3F_2\left(1,\frac{1}{r}+\frac{m}{r},\frac{1}{r}+\frac{m}{r};1+\frac{1}{r}+\frac{m}{r},1+\frac{1}{r}+\frac{m}{r};-\frac{ex^r}{d}\right)+(1+m)\,\text{Hypergeometric2F1}\left(1,\frac{1+m}{r},\right.\right.}{d(1+m)^2}$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
(x*(f*x)^m*(-(b*n*HypergeometricPFQ[{1, r^(-1) + m/r, r^(-1) + m/r}, {1 +
r^(-1) + m/r, 1 + r^(-1) + m/r}, -((e*x^r)/d)]) + (1 + m)*Hypergeometric2F
1[1, (1 + m)/r, (1 + m + r)/r, -((e*x^r)/d)]*(a + b*Log[c*x^n])))/(d*(1 +
m)^2)
```

3.444.3 Rubi [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^r} \, dx$$

$$\Big\downarrow \ 2796$$

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^r} dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r),x]
```

output
```
$Aborted
```

3.444.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.444.4 Maple [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a + b\ln(c\,x^n))}{d + e\,x^r} dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r),x)
```

3.444.5 Fricas [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.32

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^r}\,dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{ex^r + d}\,dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(e*x^r + d), x)
```

3.444.6 Sympy [N/A]

Not integrable

Time = 6.05 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^r}\,dx = \int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^r}\,dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))/(d+e*x**r),x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x**r), x)
```

3.444.7 Maxima [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b\log(cx^n))}{d + ex^r}\,dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{ex^r + d}\,dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^r + d), x)
```

3.444.8 Giac [N/A]

Not integrable

Time = 0.33 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b \log(cx^n))}{d + ex^r} dx = \int \frac{(b \log(cx^n) + a)(fx)^m}{ex^r + d} dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^r + d), x)
```

3.444.9 Mupad [N/A]

Not integrable

Time = 0.45 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b \log(cx^n))}{d + ex^r} dx = \int \frac{(f x)^m (a + b \ln(c x^n))}{d + e x^r} dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^r),x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^r), x)
```

3.445 $\int \frac{(fx)^m(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$

3.445.1 Optimal result

Integrand size = 25, antiderivative size = 25

$$\int \frac{(fx)^m\,(a+b\log(cx^n))}{(d+ex^r)^2}\,dx=\text{Int}\left(\frac{(fx)^m\,(a+b\log(cx^n))}{(d+ex^r)^2},x\right)$$

output
```
Unintegrable((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

3.445.2 Mathematica [B] (verified)

Leaf count is larger than twice the leaf count of optimal. 177 vs. 2(28) = 56.

Time = 0.30 (sec) , antiderivative size = 177, normalized size of antiderivative = 7.08

$$\int \frac{(fx)^m\,(a+b\log(cx^n))}{(d+ex^r)^2}\,dx$$
$$=\frac{x(fx)^m\,\big(bn(1+m-r)\,(d+ex^r)\;{}_3F_2\big(1,\tfrac{1}{r}+\tfrac{m}{r},\tfrac{1}{r}+\tfrac{m}{r};1+\tfrac{1}{r}+\tfrac{m}{r},1+\tfrac{1}{r}+\tfrac{m}{r};-\tfrac{ex^r}{d}\big)-(1+m)\,(-d(1+\cdots}{d^2\cdots}$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
(x*(f*x)^m*(b*n*(1 + m - r)*(d + e*x^r)*HypergeometricPFQ[{1, r^(-1) + m/r
, r^(-1) + m/r}, {1 + r^(-1) + m/r, 1 + r^(-1) + m/r}, -((e*x^r)/d)] - (1
+ m)*(-(d*(1 + m)*(a + b*Log[c*x^n])) + (d + e*x^r)*Hypergeometric2F1[1, (
1 + m)/r, (1 + m + r)/r, -((e*x^r)/d)]*(b*n + a*(1 + m - r) + b*(1 + m - r
)*Log[c*x^n]))))/(d^2*(1 + m)^2*r*(d + e*x^r))
```

3.445.3 Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^r)^2} dx$$

$$\Big\downarrow \text{ 2796}$$

$$\int \frac{(fx)^m (a+b\log(cx^n))}{(d+ex^r)^2} dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n]))/(d + e*x^r)^2,x]
```

output
```
$Aborted
```

3.445.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.445.4 Maple [N/A]

Not integrable

Time = 0.06 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a+b\ln(c\,x^n))}{(d+e\,x^r)^2} dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))/(d+e*x^r)^2,x)
```

3.445.5 Fricas [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.84

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^r)^2}\,dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex^r + d)^2}\,dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral(((f*x)^m*b*log(c*x^n) + (f*x)^m*a)/(e^2*x^(2*r) + 2*d*e*x^r + d^2
), x)
```

3.445.6 Sympy [N/A]

Not integrable

Time = 23.53 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^r)^2}\,dx = \int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^r)^2}\,dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))/(d+e*x**r)**2,x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))/(d + e*x**r)**2, x)
```

3.445.7 Maxima [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^r)^2}\,dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex^r + d)^2}\,dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^r + d)^2, x)
```

3.445.8 Giac [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^r)^2} \, dx = \int \frac{(b\log(cx^n) + a)(fx)^m}{(ex^r + d)^2} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(f*x)^m/(e*x^r + d)^2, x)
```

3.445.9 Mupad [N/A]

Not integrable

Time = 0.52 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.08

$$\int \frac{(fx)^m (a + b\log(cx^n))}{(d + ex^r)^2} \, dx = \int \frac{(f\,x)^m\,(a + b\,\ln(c\,x^n))}{(d + e\,x^r)^2} \, dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^r)^2,x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n)))/(d + e*x^r)^2, x)
```

3.446 $\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx$

3.446.1 Optimal result

Integrand size = 26, antiderivative size = 102

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx = -bnx\left(d+ex^{-\frac{1}{1+q}}\right)^q \left(1+\frac{ex^{-\frac{1}{1+q}}}{d}\right)^{-q} \text{Hypergeometric2F1}\left(-1-q,-1-q,-q,-\frac{ex^{-\frac{1}{1+q}}}{d}\right) + \frac{x\left(d+ex^{-\frac{1}{1+q}}\right)^{1+q}(a+b\log(cx^n))}{d}$$

output
```
-b*n*x*(d+e/(x^(1/(1+q))))^q*hypergeom([-1-q, -1-q],[-q],-e/d/(x^(1/(1+q))
))/((1+e/d/(x^(1/(1+q))))^q)+x*(d+e/(x^(1/(1+q))))^(1+q)*(a+b*ln(c*x^n))/d
```

3.446.2 Mathematica [A] (verified)

Time = 0.51 (sec) , antiderivative size = 143, normalized size of antiderivative = 1.40

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx$$
$$=\frac{x^{-\frac{1}{1+q}}\left(d+ex^{-\frac{1}{1+q}}\right)^q\left(1+\frac{dx^{\frac{1}{1+q}}}{e}\right)^{-q}\left(-bdn(1+q)^2x^{\frac{2+q}{1+q}}\,{}_3F_2\left(1,1,-q;2,2;-\frac{dx^{\frac{1}{1+q}}}{e}\right)-benx\log(x)+\left(1\right.\right.}{d}$$

input
```
Integrate[(d + e/x^(1 + q)^(-1))^q*(a + b*Log[c*x^n]),x]
```

output
```
((d + e/x^(1 + q)^(-1))^q*(-(b*d*n*(1 + q)^2*x^((2 + q)/(1 + q))*Hypergeom
etricPFQ[{1, 1, -q}, {2, 2}, -((d*x^(1 + q)^(-1))/e)]) - b*e*n*x*Log[x] +
(1 + (d*x^(1 + q)^(-1))/e)^q*(e*x + d*x^((2 + q)/(1 + q)))*(a + b*Log[c*x^
n])))/(d*x^(1 + q)^(-1)*(1 + (d*x^(1 + q)^(-1))/e)^q)
```

3.446.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 94, normalized size of antiderivative = 0.92, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.115$, Rules used = {2751, 776, 74}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \left(d+ex^{-\frac{1}{q+1}}\right)^q (a+b\log(cx^n))\,dx$$
$$\Big\downarrow \; 2751$$
$$\frac{x\left(d+ex^{-\frac{1}{q+1}}\right)^{q+1}(a+b\log(cx^n))}{d}-\frac{bn\int \left(ex^{-\frac{1}{q+1}}+d\right)^{q+1}dx}{d}$$
$$\Big\downarrow \; 776$$
$$\frac{bn(q+1)x\left(\frac{x^{-\frac{1}{q+1}}}{d+ex^{-\frac{1}{q+1}}}\right)^{q+1}\left(d+ex^{-\frac{1}{q+1}}\right)^{q+1}\int \frac{\left(\frac{x^{-\frac{1}{q+1}}}{ex^{-\frac{1}{q+1}}+d}\right)^{-q-2}}{1-\frac{ex^{-\frac{1}{q+1}}}{ex^{-\frac{1}{q+1}}+d}}d\frac{x^{-\frac{1}{q+1}}}{ex^{-\frac{1}{q+1}}+d}}{d}+\frac{x\left(d+ex^{-\frac{1}{q+1}}\right)^{q+1}(a+b\log(cx^n))}{d}$$

$$\Big\downarrow \text{74}$$

$$\frac{x\left(d+ex^{-\frac{1}{q+1}}\right)^{q+1}(a+b\log(cx^n))}{d}-\frac{bnx\left(d+ex^{-\frac{1}{q+1}}\right)^{q+1}\text{Hypergeometric2F1}\left(1,-q-1,-q,\frac{ex^{-\frac{1}{q+1}}}{ex^{-\frac{1}{q+1}}+d}\right)}{d}$$

input
```
Int[(d + e/x^(1 + q)^(-1))^q*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*x*(d + e/x^(1 + q)^(-1))^(1 + q)*Hypergeometric2F1[1, -1 - q, -q, e
/(x^(1 + q)^(-1)*(d + e/x^(1 + q)^(-1)))])/d) + (x*(d + e/x^(1 + q)^(-1))^
(1 + q)*(a + b*Log[c*x^n]))/d
```

3.446.3.1 Defintions of rubi rules used

rule 74
```
Int[((b_.)*(x_))^(m_)*((c_) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[c^n*((b*x
)^(m + 1)/(b*(m + 1)))*Hypergeometric2F1[-n, m + 1, m + 2, (-d)*(x/c)], x]
/; FreeQ[{b, c, d, m, n}, x] && !IntegerQ[m] && (IntegerQ[n] || (GtQ[c, 0]
 && !(EqQ[n, -2^(-1)] && EqQ[c^2 - d^2, 0] && GtQ[-d/(b*c), 0])))
```

rule 776
```
Int[((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[x*(a + b*x^n)^p*((x^n/
(a + b*x^n))^p/n)   Subst[Int[1/(x^(p + 1)*(1 - b*x)), x], x, x^n/(a + b*x^
n)], x] /; FreeQ[{a, b, n, p}, x] && EqQ[1/n + p, 0]
```

rule 2751
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((d_) + (e_.)*(x_)^(r_.))^(q_), x
_Symbol] :> Simp[x*(d + e*x^r)^(q + 1)*((a + b*Log[c*x^n])/d), x] - Simp[b*
(n/d)   Int[(d + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, n, q, r},
x] && EqQ[r*(q + 1) + 1, 0]
```

3.446. $\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx$

3.446.4 Maple [F]

$$\int \left(d+e\,x^{-\frac{1}{1+q}}\right)^{q} \left(a+b\ln \left(c\,x^{n}\right)\right)dx$$

input
```
int((d+e/(x^(1/(1+q))))^q*(a+b*ln(c*x^n)),x)
```

output
```
int((d+e/(x^(1/(1+q))))^q*(a+b*ln(c*x^n)),x)
```

3.446.5 Fricas [F]

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^{q} \left(a+b\log \left(cx^{n}\right)\right)\,dx = \int \left(b\log \left(cx^{n}\right)+a\right)\left(d+\frac{e}{x^{\left(\frac{1}{q+1}\right)}}\right)^{q}\,dx$$

input
```
integrate((d+e/(x^(1/(1+q))))^q*(a+b*log(c*x^n)),x, algorithm="fricas")
```

output
```
integral((b*log(c*x^n) + a)*((d*x^(1/(q + 1)) + e)/x^(1/(q + 1)))^q, x)
```

3.446.6 Sympy [F(-1)]

Timed out.

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^{q} \left(a+b\log \left(cx^{n}\right)\right)\,dx = \text{Timed out}$$

input
```
integrate((d+e/(x**(1/(1+q))))**q*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

3.446.7 Maxima [F]

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx = \int (b\log(cx^n)+a)\left(d+\frac{e}{x^{\left(\frac{1}{q+1}\right)}}\right)^q dx$$

input
```
integrate((d+e/(x^(1/(1+q))))^q*(a+b*log(c*x^n)),x, algorithm="maxima")
```

output
```
integrate((b*log(c*x^n) + a)*(d + e/x^(1/(q + 1)))^q, x)
```

3.446.8 Giac [F]

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx = \int (b\log(cx^n)+a)\left(d+\frac{e}{x^{\left(\frac{1}{q+1}\right)}}\right)^q dx$$

input
```
integrate((d+e/(x^(1/(1+q))))^q*(a+b*log(c*x^n)),x, algorithm="giac")
```

output
```
integrate((b*log(c*x^n) + a)*(d + e/x^(1/(q + 1)))^q, x)
```

3.446.9 Mupad [F(-1)]

Timed out.

$$\int \left(d+ex^{-\frac{1}{1+q}}\right)^q (a+b\log(cx^n))\,dx = \int \left(d+\frac{e}{x^{\frac{1}{q+1}}}\right)^q (a+b\,\ln(c\,x^n))\,dx$$

input
```
int((d + e/x^(1/(q + 1)))^q*(a + b*log(c*x^n)),x)
```

output
```
int((d + e/x^(1/(q + 1)))^q*(a + b*log(c*x^n)), x)
```

3.447 $\int (fx)^{-1-(1+q)r}\left(d+ex^r\right)^q\left(a+b\log\left(cx^n\right)\right)\,dx$

3.447.1 Optimal result

Integrand size = 32, antiderivative size = 119

$$\int (fx)^{-1-(1+q)r}\left(d+ex^r\right)^q\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{bn(fx)^{-((1+q)r)}\left(d+ex^r\right)^q\left(1+\frac{ex^r}{d}\right)^{-q}\text{Hypergeometric2F1}\left(-1-q,-1-q,-q,-\frac{ex^r}{d}\right)}{f(1+q)^2r^2} - \frac{(fx)^{-((1+q)r)}\left(d+ex^r\right)^{1+q}\left(a+b\log\left(cx^n\right)\right)}{df(1+q)r}$$

output
```
-b*n*(d+e*x^r)^q*hypergeom([-1-q, -1-q],[-q],-e*x^r/d)/f/(1+q)^2/r^2/((f*x
)^((1+q)*r))/((1+e*x^r/d)^q)-(d+e*x^r)^(1+q)*(a+b*ln(c*x^n))/d/f/(1+q)/r/(
(f*x)^((1+q)*r))
```

3.447.2 Mathematica [A] (verified)

Time = 0.46 (sec) , antiderivative size = 98, normalized size of antiderivative = 0.82

$$\int (fx)^{-1-(1+q)r}\left(d+ex^r\right)^q\left(a+b\log\left(cx^n\right)\right)\,dx = -\frac{(fx)^{-((1+q)r)}\left(d+ex^r\right)^q\left(bn\left(1+\frac{ex^r}{d}\right)^{-q}\text{Hypergeometric2F1}\left(-1-q,-1-q,-q,-\frac{ex^r}{d}\right)+\frac{(1+q)r(d+ex^r)(}{d}\right.}{f(1+q)^2r^2}$$

input
```
Integrate[(f*x)^(-1 - (1 + q)*r)*(d + e*x^r)^q*(a + b*Log[c*x^n]),x]
```

output
```
-(((d + e*x^r)^q*((b*n*Hypergeometric2F1[-1 - q, -1 - q, -q, -((e*x^r)/d)]
)/(1 + (e*x^r)/d)^q + ((1 + q)*r*(d + e*x^r)*(a + b*Log[c*x^n]))/d))/(f*(1
 + q)^2*r^2*(f*x)^((1 + q)*r)))
```

3.447.3 Rubi [A] (verified)

Time = 0.36 (sec) , antiderivative size = 111, normalized size of antiderivative = 0.93, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {2773, 883, 882, 74}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^{-((q+1)r)-1}(d+ex^r)^q(a+b\log(cx^n))\,dx$$

$$\Big\downarrow \text{2773}$$

$$\frac{bn\int (fx)^{-((q+1)r)-1}(ex^r+d)^{q+1}dx}{d(q+1)r}-\frac{(fx)^{-((q+1)r)}(d+ex^r)^{q+1}(a+b\log(cx^n))}{df(q+1)r}$$

$$\Big\downarrow \text{883}$$

$$\frac{bnx^{(q+1)r}(fx)^{-((q+1)r)}\int x^{-((q+1)r)-1}(ex^r+d)^{q+1}dx}{df(q+1)r}-\frac{(fx)^{-((q+1)r)}(d+ex^r)^{q+1}(a+b\log(cx^n))}{df(q+1)r}$$

$$\Big\downarrow \text{882}$$

$$\frac{bn(fx)^{-((q+1)r)}\left(\frac{x^r}{d+ex^r}\right)^{q+1}(d+ex^r)^{q+1}\int \frac{\left(\frac{x^r}{ex^r+d}\right)^{-q-2}}{1-\frac{ex^r}{ex^r+d}}d\frac{x^r}{ex^r+d}}{df(q+1)r^2}-\frac{(fx)^{-((q+1)r)}(d+ex^r)^{q+1}(a+b\log(cx^n))}{df(q+1)r}$$

$$\Big\downarrow \text{74}$$

$$-\frac{(fx)^{-((q+1)r)}(d+ex^r)^{q+1}(a+b\log(cx^n))}{df(q+1)r}-\frac{bn(fx)^{-((q+1)r)}(d+ex^r)^{q+1}\text{Hypergeometric2F1}\left(1,-q-1,-q,\frac{ex^r}{ex^r+d}\right)}{df(q+1)^2r^2}$$

input
```
Int[(f*x)^(-1 - (1 + q)*r)*(d + e*x^r)^q*(a + b*Log[c*x^n]),x]
```

output
```
-((b*n*(d + e*x^r)^(1 + q)*Hypergeometric2F1[1, -1 - q, -q, (e*x^r)/(d + e
*x^r)])/(d*f*(1 + q)^2*r^2*(f*x)^((1 + q)*r))) - ((d + e*x^r)^(1 + q)*(a +
 b*Log[c*x^n]))/(d*f*(1 + q)*r*(f*x)^((1 + q)*r))
```

3.447.3.1 Defintions of rubi rules used

rule 74
```
Int[((b_.)*(x_))^(m_)*((c_) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[c^n*((b*x
)^(m + 1)/(b*(m + 1)))*Hypergeometric2F1[-n, m + 1, m + 2, (-d)*(x/c)], x]
/; FreeQ[{b, c, d, m, n}, x] &&  !IntegerQ[m] && (IntegerQ[n] || (GtQ[c, 0]
 &&  !(EqQ[n, -2^(-1)] && EqQ[c^2 - d^2, 0] && GtQ[-d/(b*c), 0])))
```

rule 882
```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[a^Simplify[
(m + 1)/n + p]*x^m*(a + b*x^n)^p*((x^n/(a + b*x^n))^p/(n*x^Simplify[m + n*p
]))   Subst[Int[x^((m + 1)/n - 1)/(1 - b*x)^(Simplify[(m + 1)/n + p] + 1),
x], x, x^n/(a + b*x^n)], x] /; FreeQ[{a, b, m, n, p}, x] && IntegerQ[Simpli
fy[(m + 1)/n + p]]
```

rule 883
```
Int[((c_)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[c^Int
Part[m]*((c*x)^FracPart[m]/x^FracPart[m])   Int[x^m*(a + b*x^n)^p, x], x] /
; FreeQ[{a, b, c, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n + p]]
```

rule 2773
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*((f_.)*(x_))^(m_.)*((d_) + (e_.)*
(x_)^(r_.))^(q_), x_Symbol] :> Simp[(f*x)^(m + 1)*(d + e*x^r)^(q + 1)*((a +
 b*Log[c*x^n])/(d*f*(m + 1))), x] - Simp[b*(n/(d*(m + 1)))   Int[(f*x)^m*(d
 + e*x^r)^(q + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m, n, q, r}, x] && Eq
Q[m + r*(q + 1) + 1, 0] && NeQ[m, -1]
```

3.447.4 Maple [F]

$$\int (fx)^{-1-(1+q)r} \left(d+e\,x^{r}\right)^{q} \left(a+b\ln \left(c\,x^{n}\right)\right)dx$$

input
```
int((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*ln(c*x^n)),x)
```

output
```
int((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*ln(c*x^n)),x)
```

3.447.5 Fricas [F]

$$\int (fx)^{-1-(1+q)r} (d+ex^r)^q (a+b\log(cx^n)) \, dx = \int (b\log(cx^n)+a)(ex^r+d)^q(fx)^{-(q+1)r-1} \, dx$$

input
```
integrate((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*log(c*x^n)),x, algorithm="fr
icas")
```

output
```
integral(((f*x)^(-(q + 1)*r - 1)*b*log(c*x^n) + (f*x)^(-(q + 1)*r - 1)*a)*
(e*x^r + d)^q, x)
```

3.447.6 Sympy [F(-1)]

Timed out.

$$\int (fx)^{-1-(1+q)r} (d+ex^r)^q (a+b\log(cx^n)) \, dx = \text{Timed out}$$

input
```
integrate((f*x)**(-1-(1+q)*r)*(d+e*x**r)**q*(a+b*ln(c*x**n)),x)
```

output
```
Timed out
```

3.447.7 Maxima [F]

$$\int (fx)^{-1-(1+q)r} (d+ex^r)^q (a+b\log(cx^n)) \, dx = \int (b\log(cx^n)+a)(ex^r+d)^q(fx)^{-(q+1)r-1} \, dx$$

input
```
integrate((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*log(c*x^n)),x, algorithm="ma
xima")
```

output
```
integrate((b*log(c*x^n) + a)*(e*x^r + d)^q*(f*x)^(-(q + 1)*r - 1), x)
```

3.447.8 Giac [F]

$$\int (fx)^{-1-(1+q)r}\left(d+ex^r\right)^q\left(a+b\log\left(cx^n\right)\right)\,dx=\int (b\log\left(cx^n\right)+a)(ex^r+d)^q(fx)^{-(q+1)r-1}\,dx$$

input
```
integrate((f*x)^(-1-(1+q)*r)*(d+e*x^r)^q*(a+b*log(c*x^n)),x, algorithm="gi
ac")
```

output
```
integrate((b*log(c*x^n) + a)*(e*x^r + d)^q*(f*x)^(-(q + 1)*r - 1), x)
```

3.447.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^{-1-(1+q)r}\left(d+ex^r\right)^q\left(a+b\log\left(cx^n\right)\right)\,dx=\int \frac{\left(d+e\,x^r\right)^q\,\left(a+b\,\ln\left(c\,x^n\right)\right)}{\left(f\,x\right)^{r\,(q+1)+1}}\,dx$$

input
```
int(((d + e*x^r)^q*(a + b*log(c*x^n)))/(f*x)^(r*(q + 1) + 1),x)
```

output
```
int(((d + e*x^r)^q*(a + b*log(c*x^n)))/(f*x)^(r*(q + 1) + 1), x)
```

3.448 $\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx$

3.448.1 Optimal result

Integrand size = 27, antiderivative size = 480

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx$$
$$= \frac{d^3 e^{-\frac{a(1+m)}{bn}} (fx)^{1+m} (cx^n)^{-\frac{1+m}{n}} \Gamma\left(1+p, -\frac{(1+m)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{f(1+m)}$$
$$+ \frac{3d^2 e e^{-\frac{a(1+m+r)}{bn}} x^{1+r} (fx)^m (cx^n)^{-\frac{1+m+r}{n}} \Gamma\left(1+p, -\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m+r)(a+b\log}{bn}\right.}{1+m+r}$$
$$+ \frac{3de^2 e^{-\frac{a(1+m+2r)}{bn}} x^{1+2r} (fx)^m (cx^n)^{-\frac{1+m+2r}{n}} \Gamma\left(1+p, -\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m+2r)(}{}\right.}{1+m+2r}$$
$$+ \frac{e^3 e^{-\frac{a(1+m+3r)}{bn}} x^{1+3r} (fx)^m (cx^n)^{-\frac{1+m+3r}{n}} \Gamma\left(1+p, -\frac{(1+m+3r)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m+3r)(a+b}{bn}\right.}{1+m+3r}$$

output
```
d^3*(f*x)^(1+m)*GAMMA(p+1,-(1+m)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/ex
p(a*(1+m)/b/n)/f/(1+m)/((c*x^n)^((1+m)/n))/((-(1+m)*(a+b*ln(c*x^n))/b/n)^p
)+3*d^2*e*x^(1+r)*(f*x)^m*GAMMA(p+1,-(1+m+r)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(
c*x^n))^p/exp(a*(1+m+r)/b/n)/(1+m+r)/((c*x^n)^((1+m+r)/n))/((-(1+m+r)*(a+b
*ln(c*x^n))/b/n)^p)+3*d*e^2*x^(1+2*r)*(f*x)^m*GAMMA(p+1,-(1+m+2*r)*(a+b*ln
(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(a*(1+m+2*r)/b/n)/(1+m+2*r)/((c*x^n)^((
1+m+2*r)/n))/((-(1+m+2*r)*(a+b*ln(c*x^n))/b/n)^p)+e^3*x^(1+3*r)*(f*x)^m*GA
MMA(p+1,-(1+m+3*r)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(a*(1+m+3*r)/
b/n)/(1+m+3*r)/((c*x^n)^((1+m+3*r)/n))/((-(1+m+3*r)*(a+b*ln(c*x^n))/b/n)^p
)
```

3.448.2 Mathematica [A] (verified)

Time = 1.52 (sec) , antiderivative size = 408, normalized size of antiderivative = 0.85

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p\,dx = x^{-m}(fx)^m (a +b\log(cx^n))^p \left(\frac{d^3 e^{-\frac{(1+m)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m} +e\left(\frac{3d^2 e^{-\frac{(1+m+r)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+r} +e\left(\frac{3de^{-\frac{(1+m+2r)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+2r}+\frac{ee^{-\frac{(1+m+}{}}}{}\right.\right.\right.$$

input
```
Integrate[(f*x)^m*(d + e*x^r)^3*(a + b*Log[c*x^n])^p,x]
```

output
```
((f*x)^m*(a + b*Log[c*x^n])^p*((d^3*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x
^n]))/(b*n))])/(E^(((1 + m)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m
)*(-(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + e*((3*d^2*Gamma[1 + p, -(((
1 + m + r)*(a + b*Log[c*x^n]))/(b*n))])/(E^(((1 + m + r)*(a - b*n*Log[x] +
 b*Log[c*x^n]))/(b*n))*(1 + m + r)*(-(((1 + m + r)*(a + b*Log[c*x^n]))/(b*
n)))^p) + e*((3*d*Gamma[1 + p, -(((1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n))
])/(E^(((1 + m + 2*r)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m + 2*r
)*(-(((1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e*Gamma[1 + p, -(((1
 + m + 3*r)*(a + b*Log[c*x^n]))/(b*n))])/(E^(((1 + m + 3*r)*(a - b*n*Log[x
] + b*Log[c*x^n]))/(b*n))*(1 + m + 3*r)*(-(((1 + m + 3*r)*(a + b*Log[c*x^n
]))/(b*n)))^p)))))/x^m
```

3.448.3 Rubi [A] (verified)

Time = 0.97 (sec) , antiderivative size = 480, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}} = 0.074$, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m \left(d+ex^r\right)^3 (a+b\log(cx^n))^p\,dx$$

$$\Big\downarrow \; 2795$$

$$\int \left(d^3(fx)^m (a+b\log(cx^n))^p+3d^2ex^r(fx)^m (a+b\log(cx^n))^p+3de^2x^{2r}(fx)^m (a+b\log(cx^n))^p+e^3x^{3r}(fx)^m (\right.$$

$$\Big\downarrow \; 2009$$

$$\frac{d^3(fx)^{m+1}e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{f(m+1)}+$$
$$\frac{3d^2ex^{r+1}(fx)^me^{-\frac{a(m+r+1)}{bn}}(cx^n)^{-\frac{m+r+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+r+1)(a+b\log(cx^n}{bn}\right.}{m+r+1}$$
$$\frac{3de^2x^{2r+1}(fx)^me^{-\frac{a(m+2r+1)}{bn}}(cx^n)^{-\frac{m+2r+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+2r+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+2r+1)(a+b\log}{bn}\right.}{m+2r+1}$$
$$\frac{e^3x^{3r+1}(fx)^me^{-\frac{a(m+3r+1)}{bn}}(cx^n)^{-\frac{m+3r+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+3r+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+3r+1)(a+b\log(c}{bn}\right.}{m+3r+1}$$

input
```
Int[(f*x)^m*(d + e*x^r)^3*(a + b*Log[c*x^n])^p,x]
```

output
```
(d^3*(f*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a
+ b*Log[c*x^n])^p)/(E^((a*(1 + m))/(b*n))*f*(1 + m)*(c*x^n)^((1 + m)/n)*(-
(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + (3*d^2*e*x^(1 + r)*(f*x)^m*Gamm
a[1 + p, -(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/
(E^((a*(1 + m + r))/(b*n))*(1 + m + r)*(c*x^n)^((1 + m + r)/n)*(-(((1 + m
+ r)*(a + b*Log[c*x^n]))/(b*n)))^p) + (3*d*e^2*x^(1 + 2*r)*(f*x)^m*Gamma[1
 + p, -(((1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(
E^((a*(1 + m + 2*r))/(b*n))*(1 + m + 2*r)*(c*x^n)^((1 + m + 2*r)/n)*(-(((1
 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e^3*x^(1 + 3*r)*(f*x)^m*Gamm
a[1 + p, -(((1 + m + 3*r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p
)/(E^((a*(1 + m + 3*r))/(b*n))*(1 + m + 3*r)*(c*x^n)^((1 + m + 3*r)/n)*(-(
((1 + m + 3*r)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

3.448. $\int (fx)^m \left(d+ex^r\right)^3 (a+b\log(cx^n))^p\,dx$

3.448.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.448.4 Maple [F]

$$\int (fx)^m (d + e x^r)^3 (a + b \ln (c x^n))^p dx$$

input
```
int((f*x)^m*(d+e*x^r)^3*(a+b*ln(c*x^n))^p,x)
```

output
```
int((f*x)^m*(d+e*x^r)^3*(a+b*ln(c*x^n))^p,x)
```

3.448.5 Fricas [F]

$$\int (fx)^m (d + ex^r)^3 (a + b \log (cx^n))^p \, dx = \int (ex^r + d)^3 (fx)^m (b \log (cx^n) + a)^p \, dx$$

input
```
integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

output
```
integral((e^3*x^(3*r) + 3*d*e^2*x^(2*r) + 3*d^2*e*x^r + d^3)*(f*x)^m*(b*lo
g(c*x^n) + a)^p, x)
```

3.448.6 Sympy [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx = \text{Timed out}$$

input
```
integrate((f*x)**m*(d+e*x**r)**3*(a+b*ln(c*x**n))**p,x)
```

output
```
Timed out
```

3.448.7 Maxima [F(-2)]

Exception generated.

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n))^p,x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.448.8 Giac [F]

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx = \int (ex^r+d)^3 (fx)^m (b\log(cx^n)+a)^p \, dx$$

input
```
integrate((f*x)^m*(d+e*x^r)^3*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^3*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

3.448.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^r)^3 (a+b\log(cx^n))^p \, dx = \int (f\,x)^m \left(d+e\,x^r\right)^3 \left(a+b\,\ln\left(c\,x^n\right)\right)^p \, dx$$

input
```
int((f*x)^m*(d + e*x^r)^3*(a + b*log(c*x^n))^p,x)
```

output
```
int((f*x)^m*(d + e*x^r)^3*(a + b*log(c*x^n))^p, x)
```

3.449 $\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx$

3.449.1 Optimal result

Integrand size = 27, antiderivative size = 350

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx$$

$$= \frac{d^2 e^{-\frac{a(1+m)}{bn}} (fx)^{1+m} (cx^n)^{-\frac{1+m}{n}} \Gamma\left(1+p, -\frac{(1+m)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{f(1+m)}$$

$$+ \frac{2dee^{-\frac{a(1+m+r)}{bn}} x^{1+r} (fx)^m (cx^n)^{-\frac{1+m+r}{n}} \Gamma\left(1+p, -\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m+r)(a+b\log}{bn}\right.}{1+m+r}$$

$$+ \frac{e^2 e^{-\frac{a(1+m+2r)}{bn}} x^{1+2r} (fx)^m (cx^n)^{-\frac{1+m+2r}{n}} \Gamma\left(1+p, -\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right) (a+b\log(cx^n))^p \left(-\frac{(1+m+2r)(a+}{bn}\right.}{1+m+2r}$$

output
```
d^2*(f*x)^(1+m)*GAMMA(p+1,-(1+m)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/ex
p(a*(1+m)/b/n)/f/(1+m)/((c*x^n)^((1+m)/n))/((-(1+m)*(a+b*ln(c*x^n))/b/n)^p
)+2*d*e*x^(1+r)*(f*x)^m*GAMMA(p+1,-(1+m+r)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*
x^n))^p/exp(a*(1+m+r)/b/n)/(1+m+r)/((c*x^n)^((1+m+r)/n))/((-(1+m+r)*(a+b*l
n(c*x^n))/b/n)^p)+e^2*x^(1+2*r)*(f*x)^m*GAMMA(p+1,-(1+m+2*r)*(a+b*ln(c*x^n
))/b/n)*(a+b*ln(c*x^n))^p/exp(a*(1+m+2*r)/b/n)/(1+m+2*r)/((c*x^n)^((1+m+2*
r)/n))/((-(1+m+2*r)*(a+b*ln(c*x^n))/b/n)^p)
```

3.449.2 Mathematica [A] (verified)

Time = 0.75 (sec) , antiderivative size = 304, normalized size of antiderivative = 0.87

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p\, dx = x^{-m}(fx)^m (a+b\log(cx^n))^p \left(\frac{d^2 e^{-\frac{(1+m)(a-bn\log(x)+b\log(cx^n))}{bn}} \Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right) \left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m} + e\left(\frac{2de^{-\frac{(1+m+r)(a-bn\log(x)+b\log(cx^n))}{bn}} \Gamma\left(1+p,-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right) \left(-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+r} + \frac{ee^{-\frac{(1+m+2r)(a-bn\log(x)+b\log(cx^n))}{bn}} \Gamma\left(1+p,-\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right) \left(-\frac{(1+m+2r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+2r} \right) \right)$$

input
```
Integrate[(f*x)^m*(d + e*x^r)^2*(a + b*Log[c*x^n])^p,x]
```

output
```
((f*x)^m*(a + b*Log[c*x^n])^p*((d^2*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x
^n]))/(b*n))])/(E^(((1 + m)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m
)*(-(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + e*((2*d*Gamma[1 + p, -(((1
+ m + r)*(a + b*Log[c*x^n]))/(b*n))])/(E^(((1 + m + r)*(a - b*n*Log[x] + b
*Log[c*x^n]))/(b*n))*(1 + m + r)*(-(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n)
))^p) + (e*Gamma[1 + p, -(((1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n))])/(E^(
((1 + m + 2*r)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m + 2*r)*(-(((
1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n)))^p))))/x^m
```

3.449.3 Rubi [A] (verified)

Time = 0.73 (sec) , antiderivative size = 350, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.074, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p\, dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(d^2 (fx)^m (a+b\log(cx^n))^p + 2dex^r (fx)^m (a+b\log(cx^n))^p + e^2 x^{2r} (fx)^m (a+b\log(cx^n))^p\right) dx$$

$$\Big\downarrow \text{ 2009}$$

$$\frac{d^2 (fx)^{m+1} e^{-\frac{a(m+1)}{bn}} (cx^n)^{-\frac{m+1}{n}} (a+b\log(cx^n))^p \left(-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)^{-p} \Gamma\left(p+1, -\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{f(m+1)} + \frac{2dex^{r+1} (fx)^m e^{-\frac{a(m+r+1)}{bn}} (cx^n)^{-\frac{m+r+1}{n}} (a+b\log(cx^n))^p \left(-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)^{-p} \Gamma\left(p+1, -\frac{(m+r+1)(a+b\log(cx^n)}{bn}\right.}{m+r+1} \frac{e^2 x^{2r+1} (fx)^m e^{-\frac{a(m+2r+1)}{bn}} (cx^n)^{-\frac{m+2r+1}{n}} (a+b\log(cx^n))^p \left(-\frac{(m+2r+1)(a+b\log(cx^n))}{bn}\right)^{-p} \Gamma\left(p+1, -\frac{(m+2r+1)(a+b\log(c}{bn}\right.}{m+2r+1}$$

input
```
Int[(f*x)^m*(d + e*x^r)^2*(a + b*Log[c*x^n])^p,x]
```

output
```
(d^2*(f*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a
+ b*Log[c*x^n])^p)/(E^((a*(1 + m))/(b*n))*f*(1 + m)*(c*x^n)^((1 + m)/n)*(-
(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + (2*d*e*x^(1 + r)*(f*x)^m*Gamma[
1 + p, -(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E
^((a*(1 + m + r))/(b*n))*(1 + m + r)*(c*x^n)^((1 + m + r)/n)*(-(((1 + m +
r)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e^2*x^(1 + 2*r)*(f*x)^m*Gamma[1 + p,
-(((1 + m + 2*r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E^((a*
(1 + m + 2*r))/(b*n))*(1 + m + 2*r)*(c*x^n)^((1 + m + 2*r)/n)*(-(((1 + m +
 2*r)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

3.449.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.449.4 Maple [F]

$$\int (fx)^m \left(d+e\,x^r\right)^2 \left(a+b\ln \left(c\,x^n\right)\right)^p dx$$

input
```
int((f*x)^m*(d+e*x^r)^2*(a+b*ln(c*x^n))^p,x)
```

output
```
int((f*x)^m*(d+e*x^r)^2*(a+b*ln(c*x^n))^p,x)
```

3.449.5 Fricas [F]

$$\int (fx)^m \left(d+ex^r\right)^2 \left(a+b\log \left(cx^n\right)\right)^p \, dx = \int (ex^r+d)^2 (fx)^m \left(b\log \left(cx^n\right)+a\right)^p \, dx$$

input
```
integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

output
```
integral((e^2*x^(2*r) + 2*d*e*x^r + d^2)*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

3.449.6 Sympy [F(-1)]

Timed out.

$$\int (fx)^m \left(d+ex^r\right)^2 \left(a+b\log \left(cx^n\right)\right)^p \, dx = \text{Timed out}$$

input
```
integrate((f*x)**m*(d+e*x**r)**2*(a+b*ln(c*x**n))**p,x)
```

output
```
Timed out
```

3.449.7 Maxima [F(-2)]

Exception generated.

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n))^p,x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.449.8 Giac [F]

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx = \int (ex^r+d)^2(fx)^m (b\log(cx^n)+a)^p \, dx$$

input
```
integrate((f*x)^m*(d+e*x^r)^2*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)^2*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

3.449.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d+ex^r)^2 (a+b\log(cx^n))^p \, dx = \int (f\,x)^m \left(d+e\,x^r\right)^2 (a+b\,\ln(c\,x^n))^p \, dx$$

input
```
int((f*x)^m*(d + e*x^r)^2*(a + b*log(c*x^n))^p,x)
```

output
```
int((f*x)^m*(d + e*x^r)^2*(a + b*log(c*x^n))^p, x)
```

3.450 $\int (fx)^m (d+ex^r) (a+b\log(cx^n))^p \, dx$

3.450.1 Optimal result

Integrand size = 25, antiderivative size = 220

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n))^p \, dx$$

$$= \frac{de^{-\frac{a(1+m)}{bn}}(fx)^{1+m}(cx^n)^{-\frac{1+m}{n}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{f(1+m)}$$

$$+\frac{ee^{-\frac{a(1+m+r)}{bn}}x^{1+r}(fx)^m(cx^n)^{-\frac{1+m+r}{n}}\Gamma\left(1+p,-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+m+r)(a+b\log(ca}{bn}\right.}{1+m+r}$$

output
```
d*(f*x)^(1+m)*GAMMA(p+1,-(1+m)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(
a*(1+m)/b/n)/f/(1+m)/((c*x^n)^((1+m)/n))/((-(1+m)*(a+b*ln(c*x^n))/b/n)^p)+
e*x^(1+r)*(f*x)^m*GAMMA(p+1,-(1+m+r)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^
p/exp(a*(1+m+r)/b/n)/(1+m+r)/((c*x^n)^((1+m+r)/n))/((-(1+m+r)*(a+b*ln(c*x^
n))/b/n)^p)
```

3.450.2 Mathematica [A] (verified)

Time = 0.35 (sec) , antiderivative size = 200, normalized size of antiderivative = 0.91

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n))^p \, dx = x^{-m}(fx)^m (a+b\log(cx^n))^p \left(\frac{de^{-\frac{(1+m)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m} + \frac{ee^{-\frac{(1+m+r)(a-bn\log(x)+b\log(cx^n))}{bn}}\Gamma\left(1+p,-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)\left(-\frac{(1+m+r)(a+b\log(cx^n))}{bn}\right)^{-p}}{1+m+r} \right)$$

input
```
Integrate[(f*x)^m*(d + e*x^r)*(a + b*Log[c*x^n])^p,x]
```

output
```
((f*x)^m*(a + b*Log[c*x^n])^p*((d*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n
]))/(b*n))])/(E^(((1 + m)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*(1 + m)*
(-(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e*Gamma[1 + p, -(((1 + m + r
)*(a + b*Log[c*x^n]))/(b*n))])/(E^(((1 + m + r)*(a - b*n*Log[x] + b*Log[c*
x^n]))/(b*n))*(1 + m + r)*(-(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n)))^p)))
/x^m
```

3.450.3 Rubi [A] (verified)

Time = 0.50 (sec) , antiderivative size = 220, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.080, Rules used = {2795, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (d+ex^r) (a+b\log(cx^n))^p \, dx$$

$$\Big\downarrow \text{2795}$$

$$\int \left(d(fx)^m (a+b\log(cx^n))^p + ex^r(fx)^m (a+b\log(cx^n))^p\right) dx$$

$$\Big\downarrow \text{2009}$$

$$\frac{d(fx)^{m+1}e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{f(m+1)}+\frac{ex^{r+1}(fx)^m e^{-\frac{a(m+r+1)}{bn}}(cx^n)^{-\frac{m+r+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+r+1)(a+b\log(cx^n))}{bn}\right)}{m+r+1}$$

input
```
Int[(f*x)^m*(d + e*x^r)*(a + b*Log[c*x^n])^p,x]
```

output
```
(d*(f*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a +
b*Log[c*x^n])^p)/(E^((a*(1 + m))/(b*n))*f*(1 + m)*(c*x^n)^((1 + m)/n)*(-((
(1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p) + (e*x^(1 + r)*(f*x)^m*Gamma[1 + p,
 -(((1 + m + r)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*x^n])^p)/(E^((a*(
1 + m + r))/(b*n))*(1 + m + r)*(c*x^n)^((1 + m + r)/n)*(-(((1 + m + r)*(a
+ b*Log[c*x^n]))/(b*n)))^p)
```

3.450.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2795
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> With[{u = ExpandIntegrand[(a + b*Log[
c*x^n])^p, (f*x)^m*(d + e*x^r)^q, x]}, Int[u, x] /; SumQ[u]] /; FreeQ[{a, b
, c, d, e, f, m, n, p, q, r}, x] && IntegerQ[q] && (GtQ[q, 0] || (IGtQ[p, 0
] && IntegerQ[m] && IntegerQ[r]))
```

3.450.4 Maple [F]

$$\int (fx)^m (d+e\,x^r)(a+b\ln(c\,x^n))^p dx$$

input
```
int((f*x)^m*(d+e*x^r)*(a+b*ln(c*x^n))^p,x)
```

output
```
int((f*x)^m*(d+e*x^r)*(a+b*ln(c*x^n))^p,x)
```

3.450.5 Fricas [F]

$$\int (fx)^m (d + ex^r) (a + b \log (cx^n))^p \, dx = \int (ex^r + d)(fx)^m (b \log (cx^n) + a)^p \, dx$$

input
```
integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

output
```
integral((e*x^r + d)*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

3.450.6 Sympy [F]

$$\int (fx)^m (d + ex^r) (a + b \log (cx^n))^p \, dx = \int (fx)^m (a + b \log (cx^n))^p (d + ex^r) \, dx$$

input
```
integrate((f*x)**m*(d+e*x**r)*(a+b*ln(c*x**n))**p,x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))**p*(d + e*x**r), x)
```

3.450.7 Maxima [F(-2)]

Exception generated.

$$\int (fx)^m (d + ex^r) (a + b \log (cx^n))^p \, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n))^p,x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.450.8 Giac [F]

$$\int (fx)^m (d + ex^r) (a + b \log (cx^n))^p \, dx = \int (ex^r + d)(fx)^m (b \log (cx^n) + a)^p \, dx$$

input
```
integrate((f*x)^m*(d+e*x^r)*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

output
```
integrate((e*x^r + d)*(f*x)^m*(b*log(c*x^n) + a)^p, x)
```

3.450.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m (d + ex^r) (a + b \log (cx^n))^p \, dx = \int (f\,x)^m \,(d + e\,x^r)\, (a + b\,\ln (c\,x^n))^p \, dx$$

input
```
int((f*x)^m*(d + e*x^r)*(a + b*log(c*x^n))^p,x)
```

output
```
int((f*x)^m*(d + e*x^r)*(a + b*log(c*x^n))^p, x)
```

3.451 $\int (fx)^m (a+b\log(cx^n))^p \, dx$

3.451.1 Optimal result

Integrand size = 18, antiderivative size = 106

$$\int (fx)^m (a+b\log(cx^n))^p \, dx = \frac{e^{-\frac{a(1+m)}{bn}}(fx)^{1+m}(cx^n)^{-\frac{1+m}{n}}\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-p}}{f(1+m)}$$

output
```
(f*x)^(1+m)*GAMMA(p+1,-(1+m)*(a+b*ln(c*x^n))/b/n)*(a+b*ln(c*x^n))^p/exp(a*
(1+m)/b/n)/f/(1+m)/((c*x^n)^((1+m)/n))/((-(1+m)*(a+b*ln(c*x^n))/b/n)^p)
```

3.451.2 Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 107, normalized size of antiderivative = 1.01

$$\int (fx)^m (a+b\log(cx^n))^p \, dx = \frac{e^{-\frac{(1+m)(a+b(-n\log(x)+\log(cx^n)))}{bn}}x^{-m}(fx)^m\Gamma\left(1+p,-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)(a+b\log(cx^n))^p\left(-\frac{(1+m)(a+b\log(cx^n))}{bn}\right)^{-}}{1+m}$$

input
```
Integrate[(f*x)^m*(a + b*Log[c*x^n])^p,x]
```

output
```
((f*x)^m*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*Log[c*
x^n])^p)/(E^(((1 + m)*(a + b*(-(n*Log[x]) + Log[c*x^n])))/(b*n))*(1 + m)*x
^m*(-(((1 + m)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

3.451.3 Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 106, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {2747, 2612}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int (fx)^m (a+b\log(cx^n))^p \, dx$$

$$\Big\downarrow \text{2747}$$

$$\frac{(fx)^{m+1}(cx^n)^{-\frac{m+1}{n}}\int (cx^n)^{\frac{m+1}{n}}(a+b\log(cx^n))^p d\log(cx^n)}{fn}$$

$$\Big\downarrow \text{2612}$$

$$\frac{(fx)^{m+1}e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}(a+b\log(cx^n))^p\left(-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)^{-p}\Gamma\left(p+1,-\frac{(m+1)(a+b\log(cx^n))}{bn}\right)}{f(m+1)}$$

input
```
Int[(f*x)^m*(a + b*Log[c*x^n])^p,x]
```

output
```
((f*x)^(1 + m)*Gamma[1 + p, -(((1 + m)*(a + b*Log[c*x^n]))/(b*n))]*(a + b*
Log[c*x^n])^p)/(E^((a*(1 + m))/(b*n))*f*(1 + m)*(c*x^n)^((1 + m)/n)*(-(((1
 + m)*(a + b*Log[c*x^n]))/(b*n)))^p)
```

3.451.3.1 Defintions of rubi rules used

rule 2612
```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

rule 2747
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_)*((d_.)*(x_))^(m_.), x_Symbol
] :> Simp[(d*x)^(m + 1)/(d*n*(c*x^n)^((m + 1)/n))   Subst[Int[E^(((m + 1)/n
)*x)*(a + b*x)^p, x], x, Log[c*x^n]], x] /; FreeQ[{a, b, c, d, m, n, p}, x]
```

3.451.4 Maple [F]

$$\int (fx)^m (a + b\ln (c\,x^n))^p dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))^p,x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))^p,x)
```

3.451.5 Fricas [F]

$$\int (fx)^m (a + b\log (cx^n))^p \, dx = \int (fx)^m (b\log (cx^n) + a)^p \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p,x, algorithm="fricas")
```

output
```
integral((f*x)^m*(b*log(c*x^n) + a)^p, x)
```

3.451.6 Sympy [F]

$$\int (fx)^m (a + b\log (cx^n))^p \, dx = \int (fx)^m (a + b\log (cx^n))^p \, dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))**p,x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))**p, x)
```

3.451.7 Maxima [F(-2)]

Exception generated.

$$\int (fx)^m (a+b\log(cx^n))^p \, dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p,x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.451.8 Giac [F]

$$\int (fx)^m (a+b\log(cx^n))^p \, dx = \int (fx)^m (b\log(cx^n)+a)^p \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p,x, algorithm="giac")
```

output
```
integrate((f*x)^m*(b*log(c*x^n) + a)^p, x)
```

3.451.9 Mupad [F(-1)]

Timed out.

$$\int (fx)^m (a+b\log(cx^n))^p \, dx = \int (f\,x)^m \,(a+b\,\ln(c\,x^n))^p \, dx$$

input
```
int((f*x)^m*(a + b*log(c*x^n))^p,x)
```

output
```
int((f*x)^m*(a + b*log(c*x^n))^p, x)
```

3.452 $\int \frac{(fx)^m(a+b\log(cx^n))^p}{d+ex^r}\,dx$

3.452.1 Optimal result

Integrand size = 27, antiderivative size = 27

$$\int \frac{(fx)^m \left(a+b\log\left(cx^n\right)\right)^p}{d+ex^r}\,dx = \operatorname{Int}\left(\frac{(fx)^m \left(a+b\log\left(cx^n\right)\right)^p}{d+ex^r},x\right)$$

output
```
Unintegrable((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r),x)
```

3.452.2 Mathematica [N/A]

Not integrable

Time = 1.13 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m \left(a+b\log\left(cx^n\right)\right)^p}{d+ex^r}\,dx = \int \frac{(fx)^m \left(a+b\log\left(cx^n\right)\right)^p}{d+ex^r}\,dx$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r),x]
```

output
```
Integrate[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r), x]
```

3.452.3 Rubi [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{d+ex^r} \, dx$$

$$\Big\downarrow \; 2796$$

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{d+ex^r} dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r),x]
```

output
```
$Aborted
```

3.452.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.452.4 Maple [N/A]

Not integrable

Time = 0.13 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a+b\ln(cx^n))^p}{d+ex^r} dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r),x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r),x)
```

3.452.5 Fricas [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m (a + b\log(cx^n))^p}{d + ex^r} dx = \int \frac{(fx)^m (b\log(cx^n) + a)^p}{ex^r + d} dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r),x, algorithm="fricas")
```

output
```
integral((f*x)^m*(b*log(c*x^n) + a)^p/(e*x^r + d), x)
```

3.452.6 Sympy [N/A]

Not integrable

Time = 92.38 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.89

$$\int \frac{(fx)^m (a + b\log(cx^n))^p}{d + ex^r} dx = \int \frac{(fx)^m (a + b\log(cx^n))^p}{d + ex^r} dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))**p/(d+e*x**r),x)
```

output
```
Integral((f*x)**m*(a + b*log(c*x**n))**p/(d + e*x**r), x)
```

3.452.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(fx)^m (a + b\log(cx^n))^p}{d + ex^r} dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r),x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.452.8 Giac [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m (a + b\log(cx^n))^p}{d + ex^r} \, dx = \int \frac{(fx)^m (b\log(cx^n) + a)^p}{ex^r + d} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r),x, algorithm="giac")
```

output
```
integrate((f*x)^m*(b*log(c*x^n) + a)^p/(e*x^r + d), x)
```

3.452.9 Mupad [N/A]

Not integrable

Time = 0.39 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m (a + b\log(cx^n))^p}{d + ex^r} \, dx = \int \frac{(f\,x)^m \left(a + b\,\ln(c\,x^n)\right)^p}{d + e\,x^r} \, dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n))^p)/(d + e*x^r),x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n))^p)/(d + e*x^r), x)
```

3.453 $\int \frac{(fx)^m(a+b\log(cx^n))^p}{(d+ex^r)^2}\,dx$

3.453.1 Optimal result

Integrand size = 27, antiderivative size = 27

$$\int \frac{(fx)^m(a+b\log(cx^n))^p}{(d+ex^r)^2}\,dx = \mathrm{Int}\left(\frac{(fx)^m(a+b\log(cx^n))^p}{(d+ex^r)^2},x\right)$$

output
```
Unintegrable((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r)^2,x)
```

3.453.2 Mathematica [N/A]

Not integrable

Time = 1.34 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m(a+b\log(cx^n))^p}{(d+ex^r)^2}\,dx = \int \frac{(fx)^m(a+b\log(cx^n))^p}{(d+ex^r)^2}\,dx$$

input
```
Integrate[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r)^2,x]
```

output
```
Integrate[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r)^2, x]
```

3.453.3 Rubi [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {2796}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2}dx$$
$$\Big\downarrow \text{2796}$$
$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2}dx$$

input
```
Int[((f*x)^m*(a + b*Log[c*x^n])^p)/(d + e*x^r)^2,x]
```

output
```
$Aborted
```

3.453.3.1 Defintions of rubi rules used

rule 2796
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((f_.)*(x_))^(m_.)*((d_) +
(e_.)*(x_)^(r_.))^(q_.), x_Symbol] :> Unintegrable[(f*x)^m*(d + e*x^r)^q*(a
 + b*Log[c*x^n])^p, x] /; FreeQ[{a, b, c, d, e, f, m, n, p, q, r}, x]
```

3.453.4 Maple [N/A]

Not integrable

Time = 0.14 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00

$$\int \frac{(fx)^m (a+b\ln(c\,x^n))^p}{(d+e\,x^r)^2}dx$$

input
```
int((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r)^2,x)
```

output
```
int((f*x)^m*(a+b*ln(c*x^n))^p/(d+e*x^r)^2,x)
```

3.453.5 Fricas [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.56

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2}\,dx = \int \frac{(fx)^m (b\log(cx^n)+a)^p}{(ex^r+d)^2}\,dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r)^2,x, algorithm="fricas")
```

output
```
integral((f*x)^m*(b*log(c*x^n) + a)^p/(e^2*x^(2*r) + 2*d*e*x^r + d^2), x)
```

3.453.6 Sympy [N/A]

Not integrable

Time = 0.00 (sec) , antiderivative size = 1, normalized size of antiderivative = 0.04

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2}\,dx = \int \frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2}\,dx$$

input
```
integrate((f*x)**m*(a+b*ln(c*x**n))**p/(d+e*x**r)**2,x)
```

output
```
integrate((f*x)**m*(a+b*ln(c*x**n))**p/(d+e*x**r)**2,x)
```

3.453.7 Maxima [F(-2)]

Exception generated.

$$\int \frac{(fx)^m (a+b\log(cx^n))^p}{(d+ex^r)^2}\,dx = \text{Exception raised: RuntimeError}$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r)^2,x, algorithm="maxima")
```

output
```
Exception raised: RuntimeError >> ECL says: In function CAR, the value of
the first argument is  0which is not of the expected type LIST
```

3.453.8 Giac [N/A]

Not integrable

Time = 0.38 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m (a + b\log (cx^n))^p}{(d + ex^r)^2} \, dx = \int \frac{(fx)^m (b\log (cx^n) + a)^p}{(ex^r + d)^2} \, dx$$

input
```
integrate((f*x)^m*(a+b*log(c*x^n))^p/(d+e*x^r)^2,x, algorithm="giac")
```

output
```
integrate((f*x)^m*(b*log(c*x^n) + a)^p/(e*x^r + d)^2, x)
```

3.453.9 Mupad [N/A]

Not integrable

Time = 0.43 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.07

$$\int \frac{(fx)^m (a + b\log (cx^n))^p}{(d + ex^r)^2} \, dx = \int \frac{(f\,x)^m\,(a + b\,\ln(c\,x^n))^p}{(d + e\,x^r)^2} \, dx$$

input
```
int(((f*x)^m*(a + b*log(c*x^n))^p)/(d + e*x^r)^2,x)
```

output
```
int(((f*x)^m*(a + b*log(c*x^n))^p)/(d + e*x^r)^2, x)
```

3.454 $\int \frac{(f+gx)(a+b\log(cx^n))}{(d+ex)^3}\,dx$

3.454.1 Optimal result

Integrand size = 23, antiderivative size = 115

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)}{(d+ex)^3}\,dx=\frac{b(ef-dg)n}{2de^2(d+ex)}+\frac{bf^2n\log(x)}{2d^2(ef-dg)}-\frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)}{2(ef-dg)(d+ex)^2}-\frac{b(ef+dg)n\log(d+ex)}{2d^2e^2}$$

output
```
1/2*b*(-d*g+e*f)*n/d/e^2/(e*x+d)+1/2*b*f^2*n*ln(x)/d^2/(-d*g+e*f)-1/2*(g*x
+f)^2*(a+b*ln(c*x^n))/(-d*g+e*f)/(e*x+d)^2-1/2*b*(d*g+e*f)*n*ln(e*x+d)/d^2
/e^2
```

3.454.2 Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 108, normalized size of antiderivative = 0.94

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)}{(d+ex)^3}\,dx=\frac{-\frac{(ef-dg)(a+b\log(cx^n))}{(d+ex)^2}-\frac{2g(a+b\log(cx^n))}{d+ex}+\frac{2bgn(\log(x)-\log(d+ex))}{d}+\frac{b(ef-dg)n\left(\frac{d}{d+ex}+\log(x)-\log(d+ex)\right)}{d^2}}{2e^2}$$

input
```
Integrate[((f + g*x)*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
(-(((e*f - d*g)*(a + b*Log[c*x^n]))/(d + e*x)^2) - (2*g*(a + b*Log[c*x^n])
)/(d + e*x) + (2*b*g*n*(Log[x] - Log[d + e*x]))/d + (b*(e*f - d*g)*n*(d/(d
 + e*x) + Log[x] - Log[d + e*x]))/d^2)/(2*e^2)
```

3.454.3 Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.98, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}} = 0.130$, Rules used = {2798, 99, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)}{(d+ex)^3}\,dx$$

$$\Big\downarrow \text{2798}$$

$$\frac{bn\int \frac{(f+gx)^2}{x(d+ex)^2}dx}{2(ef-dg)}-\frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)}{2(d+ex)^2(ef-dg)}$$

$$\Big\downarrow \text{99}$$

$$\frac{bn\int \left(\frac{f^2}{d^2x}+\frac{d^2g^2-e^2f^2}{d^2e(d+ex)}-\frac{(dg-ef)^2}{de(d+ex)^2}\right)dx}{2(ef-dg)}-\frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)}{2(d+ex)^2(ef-dg)}$$

$$\Big\downarrow \text{2009}$$

$$\frac{bn\left(-\left(\frac{f^2}{d^2}-\frac{g^2}{e^2}\right)\log(d+ex)+\frac{f^2\log(x)}{d^2}+\frac{(ef-dg)^2}{de^2(d+ex)}\right)}{2(ef-dg)}-\frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)}{2(d+ex)^2(ef-dg)}$$

input
```
Int[((f + g*x)*(a + b*Log[c*x^n]))/(d + e*x)^3,x]
```

output
```
-1/2*((f + g*x)^2*(a + b*Log[c*x^n]))/((e*f - d*g)*(d + e*x)^2) + (b*n*((e
*f - d*g)^2/(d*e^2*(d + e*x)) + (f^2*Log[x])/d^2 - (f^2/d^2 - g^2/e^2)*Log
[d + e*x]))/(2*(e*f - d*g))
```

3.454.3.1 Defintions of rubi rules used

rule 99
```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_)*((e_.) + (f_.)*(x_)
)^(p_), x_] :> Int[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n*(e + f*x)^p, x],
 x] /; FreeQ[{a, b, c, d, e, f, p}, x] && IntegersQ[m, n] && (IntegerQ[p] |
| (GtQ[m, 0] && GeQ[n, -1]))
```

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2798
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_)*((
f_) + (g_.)*(x_))^(m_.), x_Symbol] :> Simp[(f + g*x)^(m + 1)*(d + e*x)^(q +
 1)*((a + b*Log[c*x^n])^p/((q + 1)*(e*f - d*g))), x] - Simp[b*n*(p/((q + 1)
*(e*f - d*g)))   Int[(f + g*x)^(m + 1)*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n, q}, x] && NeQ[e*f
 - d*g, 0] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

3.454.4 Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 283 vs. 2(107) = 214.

Time = 0.68 (sec) , antiderivative size = 284, normalized size of antiderivative = 2.47

method	result
parallelrisch	$\frac{-b\,d^3 gn-2a\,d^2 ef+2\ln(x) x^2 bd\,e^2 gn+bd\,e^2 gn\,x^2-4x\ln(c\,x^n) b\,d^2 eg+2\ln(x) x^2 b\,e^3 fn-2\ln(ex+d) bd\,e^2 gn\,x^2-4\ln(ex+d) b\,d^2 eg}{}$
risch	$-\frac{b(2egx+dg+ef)\ln(x^n)}{2(ex+d)^2 e^2}+\frac{-2b\,d^2 egnx+2bd\,e^2 fnx-i\pi b\,d^3 g\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ic\,x^n)^2+i\pi b\,d^3 g\ \mathrm{csgn}(ic)\,\mathrm{csgn}(ix^n)\,\mathrm{csgn}(ic\,x^n)-}{}$

input
```
int((g*x+f)*(a+b*ln(c*x^n))/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
1/4*(-b*d^3*g*n-2*a*d^2*e*f+2*ln(x)*x^2*b*d*e^2*g*n+b*d*e^2*g*n*x^2-4*x*ln
(c*x^n)*b*d^2*e*g+2*ln(x)*x^2*b*e^3*f*n-2*ln(e*x+d)*b*d*e^2*g*n*x^2-4*ln(e
*x+d)*b*d^2*e*g*n*x-4*ln(e*x+d)*b*d*e^2*f*n*x+b*d^2*e*f*n-2*ln(e*x+d)*b*d^
3*g*n+2*ln(x)*b*d^2*e*f*n-2*ln(c*x^n)*b*d^3*g-2*ln(e*x+d)*b*e^3*f*n*x^2-2*
ln(e*x+d)*b*d^2*e*f*n+4*ln(x)*x*b*d^2*e*g*n+4*ln(x)*x*b*d*e^2*f*n+2*x^2*a*
d*e^2*g-2*ln(c*x^n)*b*d^2*e*f+2*ln(x)*b*d^3*g*n-b*e^3*f*n*x^2)/d^2/e^2/(e*
x+d)^2
```

3.454.5 Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 215 vs. $2(107) = 214$.

Time = 0.28 (sec) , antiderivative size = 215, normalized size of antiderivative = 1.87

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})}{(d+ex)^3}\,dx = -\frac{ad^2ef + ad^3g - (bd^2ef - bd^3g)n + (2\,ad^2eg - (bde^2f - bd^2eg)n)x + ((be^3f + bde^2g)nx^2 + 2\,(bde^2f + \cdots}{2\,(d^2\cdots}$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="fricas")
```

output
```
-1/2*(a*d^2*e*f + a*d^3*g - (b*d^2*e*f - b*d^3*g)*n + (2*a*d^2*e*g - (b*d*
e^2*f - b*d^2*e*g)*n)*x + ((b*e^3*f + b*d*e^2*g)*n*x^2 + 2*(b*d*e^2*f + b*
d^2*e*g)*n*x + (b*d^2*e*f + b*d^3*g)*n)*log(e*x + d) + (2*b*d^2*e*g*x + b*
d^2*e*f + b*d^3*g)*log(c) - (2*b*d*e^2*f*n*x + (b*e^3*f + b*d*e^2*g)*n*x^2
)*log(x))/(d^2*e^4*x^2 + 2*d^3*e^3*x + d^4*e^2)
```

3.454.6 Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 908 vs. $2(100) = 200$.

Time = 2.37 (sec) , antiderivative size = 908, normalized size of antiderivative = 7.90

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})}{(d+ex)^3}\,dx = \begin{cases} \tilde{\infty}\left(-\frac{af}{2x^2} - \frac{ag}{x} - \frac{bfn}{4x^2} - \frac{bf\log{(cx^n)}}{2x^2} - \frac{bgn}{x} - \frac{bg\log{(cx^n)}}{x}\right) \\ \frac{afx + \frac{agx^2}{2} - bfnx + bfx\log{(cx^n)} - \frac{bgnx^2}{4} + \frac{bgx^2\log{(cx^n)}}{2}}{d^3} \\ \frac{-\frac{af}{2x^2} - \frac{ag}{x} - \frac{bfn}{4x^2} - \frac{bf\log{(cx^n)}}{2x^2} - \frac{bgn}{x} - \frac{bg\log{(cx^n)}}{x}}{e^3} \\ -\frac{ad^3g}{2d^4e^2+4d^3e^3x+2d^2e^4x^2} - \frac{ad^2ef}{2d^4e^2+4d^3e^3x+2d^2e^4x^2} - \frac{2ad^2egx}{2d^4e^2+4d^3e^3x+2d^2e^4x^2} - \frac{bd^3gn\log{\left(\frac{d}{e}+x\right)}}{2d^4e^2+4d^3e^3x+2d^2e^4x^2} - \frac{bd^3gn}{2d^4e^2+4d^3e^3x+2d^2e\cdots} \end{cases}$$

input
```
integrate((g*x+f)*(a+b*ln(c*x**n))/(e*x+d)**3,x)
```

output
```
Piecewise((zoo*(-a*f/(2*x**2) - a*g/x - b*f*n/(4*x**2) - b*f*log(c*x**n)/(
2*x**2) - b*g*n/x - b*g*log(c*x**n)/x), Eq(d, 0) & Eq(e, 0)), ((a*f*x + a*
g*x**2/2 - b*f*n*x + b*f*x*log(c*x**n) - b*g*n*x**2/4 + b*g*x**2*log(c*x**
n)/2)/d**3, Eq(e, 0)), ((-a*f/(2*x**2) - a*g/x - b*f*n/(4*x**2) - b*f*log(
c*x**n)/(2*x**2) - b*g*n/x - b*g*log(c*x**n)/x)/e**3, Eq(d, 0)), (-a*d**3*
g/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2*e**4*x**2) - a*d**2*e*f/(2*d**4*e*
*2 + 4*d**3*e**3*x + 2*d**2*e**4*x**2) - 2*a*d**2*e*g*x/(2*d**4*e**2 + 4*d
**3*e**3*x + 2*d**2*e**4*x**2) - b*d**3*g*n*log(d/e + x)/(2*d**4*e**2 + 4*
d**3*e**3*x + 2*d**2*e**4*x**2) - b*d**3*g*n/(2*d**4*e**2 + 4*d**3*e**3*x
+ 2*d**2*e**4*x**2) - b*d**2*e*f*n*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**3
*x + 2*d**2*e**4*x**2) + b*d**2*e*f*n/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**
2*e**4*x**2) - 2*b*d**2*e*g*n*x*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**3*x
+ 2*d**2*e**4*x**2) - b*d**2*e*g*n*x/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2
*e**4*x**2) - 2*b*d*e**2*f*n*x*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**3*x +
 2*d**2*e**4*x**2) + b*d*e**2*f*n*x/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d**2*
e**4*x**2) + 2*b*d*e**2*f*x*log(c*x**n)/(2*d**4*e**2 + 4*d**3*e**3*x + 2*d
**2*e**4*x**2) - b*d*e**2*g*n*x**2*log(d/e + x)/(2*d**4*e**2 + 4*d**3*e**3
*x + 2*d**2*e**4*x**2) + b*d*e**2*g*x**2*log(c*x**n)/(2*d**4*e**2 + 4*d**3
*e**3*x + 2*d**2*e**4*x**2) - b*e**3*f*n*x**2*log(d/e + x)/(2*d**4*e**2 +
4*d**3*e**3*x + 2*d**2*e**4*x**2) + b*e**3*f*x**2*log(c*x**n)/(2*d**4*e...
```

3.454.7 Maxima [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 218 vs. $2(107) = 214$.

Time = 0.20 (sec) , antiderivative size = 218, normalized size of antiderivative = 1.90

$$\int \frac{(f+gx)(a+b\log(cx^n))}{(d+ex)^3}\,dx = \frac{1}{2}\,bfn\left(\frac{1}{de^2x+d^2e}-\frac{\log(ex+d)}{d^2e}+\frac{\log(x)}{d^2e}\right) - \frac{1}{2}\,bgn\left(\frac{1}{e^3x+de^2}+\frac{\log(ex+d)}{de^2}-\frac{\log(x)}{de^2}\right) - \frac{(2\,ex+d)bg\log(cx^n)}{2\,(e^4x^2+2\,de^3x+d^2e^2)} - \frac{(2\,ex+d)ag}{2\,(e^4x^2+2\,de^3x+d^2e^2)} - \frac{bf\log(cx^n)}{2\,(e^3x^2+2\,de^2x+d^2e)} - \frac{af}{2\,(e^3x^2+2\,de^2x+d^2e)}$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="maxima")
```

output
```
1/2*b*f*n*(1/(d*e^2*x + d^2*e) - log(e*x + d)/(d^2*e) + log(x)/(d^2*e)) -
1/2*b*g*n*(1/(e^3*x + d*e^2) + log(e*x + d)/(d*e^2) - log(x)/(d*e^2)) - 1/
2*(2*e*x + d)*b*g*log(c*x^n)/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 1/2*(2*e*x
+ d)*a*g/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 1/2*b*f*log(c*x^n)/(e^3*x^2 + 2
*d*e^2*x + d^2*e) - 1/2*a*f/(e^3*x^2 + 2*d*e^2*x + d^2*e)
```

3.454.8 Giac [A] (verification not implemented)

Time = 0.32 (sec) , antiderivative size = 199, normalized size of antiderivative = 1.73

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)}{(d+ex)^3}\,dx = -\frac{(2\,begnx+befn+bdgn)\log\left(x\right)}{2\left(e^4x^2+2\,de^3x+d^2e^2\right)} + \frac{be^2fnx-bdegnx-2\,bdegx\log\left(c\right)+bdefn-bd^2gn-2\,adegx-bdef\log\left(c\right)-bd^2g\log\left(c\right)-adef-}{2\left(de^4x^2+2\,d^2e^3x+d^3e^2\right)} - \frac{(befn+bdgn)\log\left(ex+d\right)}{2\,d^2e^2} + \frac{(befn+bdgn)\log\left(x\right)}{2\,d^2e^2}$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))/(e*x+d)^3,x, algorithm="giac")
```

output
```
-1/2*(2*b*e*g*n*x + b*e*f*n + b*d*g*n)*log(x)/(e^4*x^2 + 2*d*e^3*x + d^2*e
^2) + 1/2*(b*e^2*f*n*x - b*d*e*g*n*x - 2*b*d*e*g*x*log(c) + b*d*e*f*n - b*
d^2*g*n - 2*a*d*e*g*x - b*d*e*f*log(c) - b*d^2*g*log(c) - a*d*e*f - a*d^2*
g)/(d*e^4*x^2 + 2*d^2*e^3*x + d^3*e^2) - 1/2*(b*e*f*n + b*d*g*n)*log(e*x +
 d)/(d^2*e^2) + 1/2*(b*e*f*n + b*d*g*n)*log(x)/(d^2*e^2)
```

3.454.9 Mupad [B] (verification not implemented)

Time = 0.95 (sec) , antiderivative size = 174, normalized size of antiderivative = 1.51

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)}{(d+ex)^3}\,dx = -\frac{a\,d\,g+a\,e\,f+\frac{x\,\left(2\,a\,d\,e\,g-b\,e^2\,f\,n+b\,d\,e\,g\,n\right)}{d}+b\,d\,g\,n-b\,e\,f\,n}{2\,d^2\,e^2+4\,d\,e^3\,x+2\,e^4\,x^2} - \frac{\ln\left(c\,x^n\right)\,\left(\frac{b\,f}{2\,e}+\frac{b\,d\,g}{2\,e^2}+\frac{b\,g\,x}{e}\right)}{d^2+2\,d\,e\,x+e^2\,x^2} - \frac{b\,n\,\mathrm{atanh}\left(\frac{b\,n\,\left(d\,g+e\,f\right)\,\left(d+2\,e\,x\right)}{d\,\left(b\,d\,g\,n+b\,e\,f\,n\right)}\right)\,\left(d\,g+e\,f\right)}{d^2\,e^2}$$

input
```
int(((f + g*x)*(a + b*log(c*x^n)))/(d + e*x)^3,x)
```

output
```
- (a*d*g + a*e*f + (x*(2*a*d*e*g - b*e^2*f*n + b*d*e*g*n))/d + b*d*g*n - b
*e*f*n)/(2*d^2*e^2 + 2*e^4*x^2 + 4*d*e^3*x) - (log(c*x^n)*((b*f)/(2*e) + (
b*d*g)/(2*e^2) + (b*g*x)/e))/(d^2 + e^2*x^2 + 2*d*e*x) - (b*n*atanh((b*n*(
d*g + e*f)*(d + 2*e*x))/(d*(b*d*g*n + b*e*f*n)))*(d*g + e*f))/(d^2*e^2)
```

3.454. $\int \frac{(f+gx)(a+b\log(cx^n))}{(d+ex)^3}\,dx$

3.455 $\int \frac{(f+gx)(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

3.455.1 Optimal result

Integrand size = 25, antiderivative size = 202

$$\begin{aligned}\int \frac{(f+gx)\,(a+b\log(cx^n))^2}{(d+ex)^3}\,dx =& -\frac{b(ef-dg)nx(a+b\log(cx^n))}{d^2e(d+ex)} \\ &+ \frac{f^2(a+b\log(cx^n))^2}{2d^2(ef-dg)} - \frac{(f+gx)^2\,(a+b\log(cx^n))^2}{2(ef-dg)(d+ex)^2} \\ &+ \frac{b^2(ef-dg)n^2\log(d+ex)}{d^2e^2} \\ &- \frac{b(ef+dg)n(a+b\log(cx^n))\log\left(1+\frac{ex}{d}\right)}{d^2e^2} \\ &- \frac{b^2(ef+dg)n^2\,\mathrm{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2e^2}\end{aligned}$$

output
```
-b*(-d*g+e*f)*n*x*(a+b*ln(c*x^n))/d^2/e/(e*x+d)+1/2*f^2*(a+b*ln(c*x^n))^2/
d^2/(-d*g+e*f)-1/2*(g*x+f)^2*(a+b*ln(c*x^n))^2/(-d*g+e*f)/(e*x+d)^2+b^2*(-
d*g+e*f)*n^2*ln(e*x+d)/d^2/e^2-b*(d*g+e*f)*n*(a+b*ln(c*x^n))*ln(1+e*x/d)/d
^2/e^2-b^2*(d*g+e*f)*n^2*polylog(2,-e*x/d)/d^2/e^2
```

3.455.2 Mathematica [A] (verified)

Time = 0.15 (sec) , antiderivative size = 244, normalized size of antiderivative = 1.21

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx$$
$$= \frac{-\frac{(ef-dg)(a+b\log(cx^n))^2}{(d+ex)^2} - \frac{2g(a+b\log(cx^n))^2}{d+ex} + \frac{2g((a+b\log(cx^n))(a+b\log(cx^n)-2bn\log(1+\frac{ex}{d}))-2b^2n^2\,\mathrm{PolyLog}(2,-\frac{ex}{d}))}{d} + \frac{(ef-dg}{}}{}$$

input
```
Integrate[((f + g*x)*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
(-(((e*f - d*g)*(a + b*Log[c*x^n])^2)/(d + e*x)^2) - (2*g*(a + b*Log[c*x^n
])^2)/(d + e*x) + (2*g*((a + b*Log[c*x^n])*(a + b*Log[c*x^n] - 2*b*n*Log[1
 + (e*x)/d]) - 2*b^2*n^2*PolyLog[2, -((e*x)/d)]))/d + ((e*f - d*g)*(2*b*d*
n*(a + b*Log[c*x^n]) + (d + e*x)*(a + b*Log[c*x^n])^2 - 2*b^2*n^2*(d + e*x
)*(Log[x] - Log[d + e*x]) - 2*b*n*(d + e*x)*(a + b*Log[c*x^n])*Log[1 + (e*
x)/d] - 2*b^2*n^2*(d + e*x)*PolyLog[2, -((e*x)/d)]))/(d^2*(d + e*x)))/(2*e
^2)
```

3.455.3 Rubi [A] (verified)

Time = 0.56 (sec) , antiderivative size = 210, normalized size of antiderivative = 1.04, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2798, 2804, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx$$
$$\Big\downarrow \; 2798$$
$$\frac{bn\int \frac{(f+gx)^2(a+b\log(cx^n))}{x(d+ex)^2}dx}{ef-dg} - \frac{(f+gx)^2\,(a+b\log{(cx^n)})^2}{2(d+ex)^2(ef-dg)}$$
$$\Big\downarrow \; 2804$$

$$\frac{bn\int\left(\frac{(a+b\log(cx^n))f^2}{d^2x}+\frac{(d^2g^2-e^2f^2)(a+b\log(cx^n))}{d^2e(d+ex)}-\frac{(dg-ef)^2(a+b\log(cx^n))}{de(d+ex)^2}\right)dx}{ef-dg}-\frac{(f+gx)^2\,(a+b\log\,(cx^n))^2}{2(d+ex)^2(ef-dg)}$$

$\big\downarrow$ 2009

$$\frac{bn\left(-\left(\frac{f^2}{d^2}-\frac{g^2}{e^2}\right)\log\left(\frac{ex}{d}+1\right)(a+b\log\,(cx^n))-\frac{x(ef-dg)^2(a+b\log(cx^n))}{d^2e(d+ex)}+\frac{f^2(a+b\log(cx^n))^2}{2bd^2n}-bn\left(\frac{f^2}{d^2}-\frac{g^2}{e^2}\right)\text{PolyLog}\,(2\right.}{ef-dg}$$
$$\frac{(f+gx)^2\,(a+b\log\,(cx^n))^2}{2(d+ex)^2(ef-dg)}$$

input
```
Int[((f + g*x)*(a + b*Log[c*x^n])^2)/(d + e*x)^3,x]
```

output
```
-1/2*((f + g*x)^2*(a + b*Log[c*x^n])^2)/((e*f - d*g)*(d + e*x)^2) + (b*n*(
-(((e*f - d*g)^2*x*(a + b*Log[c*x^n]))/(d^2*e*(d + e*x))) + (f^2*(a + b*Lo
g[c*x^n])^2)/(2*b*d^2*n) + (b*(e*f - d*g)^2*n*Log[d + e*x])/(d^2*e^2) - (f
^2/d^2 - g^2/e^2)*(a + b*Log[c*x^n])*Log[1 + (e*x)/d] - b*(f^2/d^2 - g^2/e
^2)*n*PolyLog[2, -((e*x)/d)]))/(e*f - d*g)
```

3.455.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2798
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_)*((
f_) + (g_.)*(x_))^(m_.), x_Symbol] :> Simp[(f + g*x)^(m + 1)*(d + e*x)^(q +
 1)*((a + b*Log[c*x^n])^p/((q + 1)*(e*f - d*g))), x] - Simp[b*n*(p/((q + 1)
*(e*f - d*g)))   Int[(f + g*x)^(m + 1)*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n, q}, x] && NeQ[e*f
 - d*g, 0] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

rule 2804
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(RFx_), x_Symbol] :> With[{
u = ExpandIntegrand[(a + b*Log[c*x^n])^p, RFx, x]}, Int[u, x] /; SumQ[u]] /
; FreeQ[{a, b, c, n}, x] && RationalFunctionQ[RFx, x] && IGtQ[p, 0]
```

3.455. $\int \frac{(f+gx)(a+b\log(cx^n))^2}{(d+ex)^3}\,dx$

3.455.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.77 (sec) , antiderivative size = 740, normalized size of antiderivative = 3.66

method	result
risch	$-\frac{b^2\ln(x^n)^2 g}{e^2(ex+d)}+\frac{b^2\ln(x^n)^2 dg}{2e^2(ex+d)^2}-\frac{b^2\ln(x^n)^2 f}{2e(ex+d)^2}-\frac{b^2 n\ln(x^n) g}{e^2(ex+d)}+\frac{b^2 n\ln(x^n) f}{ed(ex+d)}-\frac{b^2 n\ln(x^n)\ln(ex+d) g}{e^2 d}-\frac{b^2 n\ln(x^n)\ln(ex+d)}{e\,d^2}$

input
```
int((g*x+f)*(a+b*ln(c*x^n))^2/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-b^2*ln(x^n)^2*g/e^2/(e*x+d)+1/2*b^2*ln(x^n)^2/e^2/(e*x+d)^2*d*g-1/2*b^2*l
n(x^n)^2/e/(e*x+d)^2*f-b^2*n*ln(x^n)/e^2/(e*x+d)*g+b^2*n*ln(x^n)/e/d/(e*x+
d)*f-b^2*n*ln(x^n)/e^2/d*ln(e*x+d)*g-b^2*n*ln(x^n)/e/d^2*ln(e*x+d)*f+b^2*n
*ln(x^n)/e^2/d*ln(x)*g+b^2*n*ln(x^n)/e/d^2*ln(x)*f-1/2*b^2*n^2/e^2/d*ln(x)
^2*g-1/2*b^2*n^2/e/d^2*ln(x)^2*f-b^2*n^2/e^2/d*ln(e*x+d)*g+b^2*n^2/e/d^2*l
n(e*x+d)*f+b^2*n^2/e^2/d*ln(x)*g-b^2*n^2/e/d^2*ln(x)*f+b^2*n^2/e^2/d*ln(e*
x+d)*ln(-e*x/d)*g+b^2*n^2/e/d^2*ln(e*x+d)*ln(-e*x/d)*f+b^2*n^2/e^2/d*dilog
(-e*x/d)*g+b^2*n^2/e/d^2*dilog(-e*x/d)*f+(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*cs
gn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x
^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)*b*(-ln(x^n)/e^2/(e*x+d)*g+1/2*
ln(x^n)/e^2/(e*x+d)^2*d*g-1/2*ln(x^n)/e/(e*x+d)^2*f-1/2*n/e^2*((d*g+e*f)/d
^2*ln(e*x+d)+(d*g-e*f)/d/(e*x+d)+1/d^2*(-d*g-e*f)*ln(x)))+1/4*(-I*b*Pi*csg
n(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*b*Pi*c
sgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*(-g/e^2
/(e*x+d)-1/2*(-d*g+e*f)/e^2/(e*x+d)^2)
```

3.455.5 Fricas [F]

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^2}{(d+ex)^3}\,dx=\int \frac{(gx+f)(b\log\left(cx^n\right)+a)^2}{(ex+d)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((a^2*g*x + a^2*f + (b^2*g*x + b^2*f)*log(c*x^n)^2 + 2*(a*b*g*x +
a*b*f)*log(c*x^n))/(e^3*x^3 + 3*d*e^2*x^2 + 3*d^2*e*x + d^3), x)
```

3.455.6 Sympy [F]

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx = \int \frac{(a+b\log{(cx^n)})^2\,(f+gx)}{(d+ex)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*ln(c*x**n))**2/(e*x+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))**2*(f + g*x)/(d + e*x)**3, x)
```

3.455.7 Maxima [F]

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx = \int \frac{(gx+f)(b\log{(cx^n)}+a)^2}{(ex+d)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="maxima")
```

output
```
a*b*f*n*(1/(d*e^2*x + d^2*e) - log(e*x + d)/(d^2*e) + log(x)/(d^2*e)) - a*
b*g*n*(1/(e^3*x + d*e^2) + log(e*x + d)/(d*e^2) - log(x)/(d*e^2)) - (2*e*x
 + d)*a*b*g*log(c*x^n)/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 1/2*(2*e*x + d)*a
^2*g/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - a*b*f*log(c*x^n)/(e^3*x^2 + 2*d*e^2
*x + d^2*e) - 1/2*a^2*f/(e^3*x^2 + 2*d*e^2*x + d^2*e) - 1/2*(2*b^2*e*g*x +
 (e*f + d*g)*b^2)*log(x^n)^2/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) + integrate((
b^2*e^2*g*x^2*log(c)^2 + b^2*e^2*f*x*log(c)^2 + (2*(e^2*g*n + e^2*g*log(c)
)*b^2*x^2 + (e^2*f*n + 3*d*e*g*n + 2*e^2*f*log(c))*b^2*x + (d*e*f*n + d^2*
g*n)*b^2)*log(x^n))/(e^5*x^4 + 3*d*e^4*x^3 + 3*d^2*e^3*x^2 + d^3*e^2*x), x
)
```

3.455.8 Giac [F]

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx = \int \frac{(gx+f)(b\log{(cx^n)}+a)^2}{(ex+d)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))^2/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((g*x + f)*(b*log(c*x^n) + a)^2/(e*x + d)^3, x)
```

3.455.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(f+gx)\,(a+b\log{(cx^n)})^2}{(d+ex)^3}\,dx = \int \frac{(f+g\,x)\,\left(a+b\,\ln{(c\,x^n)}\right)^2}{{(d+e\,x)}^3}\,dx$$

input
```
int(((f + g*x)*(a + b*log(c*x^n))^2)/(d + e*x)^3,x)
```

output
```
int(((f + g*x)*(a + b*log(c*x^n))^2)/(d + e*x)^3, x)
```

3.456 $\int \frac{(f+gx)(a+b\log(cx^n))^3}{(d+ex)^3}\,dx$

3.456.1 Optimal result

Integrand size = 25, antiderivative size = 295

$$\begin{aligned}\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^3}{(d+ex)^3}\,dx = & -\frac{3b(ef-dg)nx\left(a+b\log\left(cx^n\right)\right)^2}{2d^2e(d+ex)} \\ & +\frac{f^2\left(a+b\log\left(cx^n\right)\right)^3}{2d^2(ef-dg)}-\frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)^3}{2(ef-dg)(d+ex)^2} \\ & +\frac{3b^2(ef-dg)n^2\left(a+b\log\left(cx^n\right)\right)\log\left(1+\frac{ex}{d}\right)}{d^2e^2} \\ & -\frac{3b(ef+dg)n\left(a+b\log\left(cx^n\right)\right)^2\log\left(1+\frac{ex}{d}\right)}{2d^2e^2} \\ & +\frac{3b^3(ef-dg)n^3\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2e^2} \\ & -\frac{3b^2(ef+dg)n^2\left(a+b\log\left(cx^n\right)\right)\operatorname{PolyLog}\left(2,-\frac{ex}{d}\right)}{d^2e^2} \\ & +\frac{3b^3(ef+dg)n^3\operatorname{PolyLog}\left(3,-\frac{ex}{d}\right)}{d^2e^2}\end{aligned}$$

output
```
-3/2*b*(-d*g+e*f)*n*x*(a+b*ln(c*x^n))^2/d^2/e/(e*x+d)+1/2*f^2*(a+b*ln(c*x^
n))^3/d^2/(-d*g+e*f)-1/2*(g*x+f)^2*(a+b*ln(c*x^n))^3/(-d*g+e*f)/(e*x+d)^2+
3*b^2*(-d*g+e*f)*n^2*(a+b*ln(c*x^n))*ln(1+e*x/d)/d^2/e^2-3/2*b*(d*g+e*f)*n
*(a+b*ln(c*x^n))^2*ln(1+e*x/d)/d^2/e^2+3*b^3*(-d*g+e*f)*n^3*polylog(2,-e*x
/d)/d^2/e^2-3*b^2*(d*g+e*f)*n^2*(a+b*ln(c*x^n))*polylog(2,-e*x/d)/d^2/e^2+
3*b^3*(d*g+e*f)*n^3*polylog(3,-e*x/d)/d^2/e^2
```

3.456.2 Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 339, normalized size of antiderivative = 1.15

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^3}{(d+ex)^3}\,dx$$

$$= \frac{-\frac{(ef-dg)(a+b\log(cx^n))^3}{(d+ex)^2}-\frac{2g(a+b\log(cx^n))^3}{d+ex}+\frac{2g\left((a+b\log(cx^n))^2\left(a+b\log(cx^n)-3bn\log\left(1+\frac{ex}{d}\right)\right)-6b^2n^2(a+b\log(cx^n))\operatorname{PolyLog}\left(2,-\frac{e}{}\right.}{d}}{}$$

input
```
Integrate[((f + g*x)*(a + b*Log[c*x^n])^3)/(d + e*x)^3,x]
```

output
```
(-(((e*f - d*g)*(a + b*Log[c*x^n])^3)/(d + e*x)^2) - (2*g*(a + b*Log[c*x^n
])^3)/(d + e*x) + (2*g*((a + b*Log[c*x^n])^2*(a + b*Log[c*x^n] - 3*b*n*Log
[1 + (e*x)/d]) - 6*b^2*n^2*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + 6*b
^3*n^3*PolyLog[3, -((e*x)/d)]))/d + ((e*f - d*g)*(3*b*d*n*(a + b*Log[c*x^n
])^2 + (d + e*x)*(a + b*Log[c*x^n])^3 - 3*b*n*(d + e*x)*(a + b*Log[c*x^n])
^2*Log[1 + (e*x)/d] - 3*b*n*(d + e*x)*((a + b*Log[c*x^n])*(a + b*Log[c*x^n
] - 2*b*n*Log[1 + (e*x)/d]) - 2*b^2*n^2*PolyLog[2, -((e*x)/d)]) - 6*b^2*n^
2*(d + e*x)*((a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] - b*n*PolyLog[3, -(
(e*x)/d)])))/(d^2*(d + e*x)))/(2*e^2)
```

3.456.3 Rubi [A] (verified)

Time = 0.74 (sec) , antiderivative size = 312, normalized size of antiderivative = 1.06, number of steps used = 3, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.120, Rules used = {2798, 2804, 2009}

Below are the steps used by Rubi to obtain the solution. The rule number used for the transformation is given above next to the arrow. The rules definitions used are listed below.

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^3}{(d+ex)^3}\,dx$$

$$\Big\downarrow \; 2798$$

$$\frac{3bn\int \frac{(f+gx)^2(a+b\log(cx^n))^2}{x(d+ex)^2}dx}{2(ef-dg)}-\frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)^3}{2(d+ex)^2(ef-dg)}$$

$$\Big\downarrow \; 2804$$

$$\frac{3bn\int\left(\frac{f^2(a+b\log(cx^n))^2}{d^2x}+\frac{(d^2g^2-e^2f^2)(a+b\log(cx^n))^2}{d^2e(d+ex)}-\frac{(dg-ef)^2(a+b\log(cx^n))^2}{de(d+ex)^2}\right)dx}{2(ef-dg)}-\frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)^3}{2(d+ex)^2(ef-dg)}$$

$$\Big\downarrow \text{2009}$$

$$3bn\left(-2bn\left(\frac{f^2}{d^2}-\frac{g^2}{e^2}\right)\text{PolyLog}\left(2,-\frac{ex}{d}\right)\left(a+b\log\left(cx^n\right)\right)-\left(\frac{f^2}{d^2}-\frac{g^2}{e^2}\right)\log\left(\frac{ex}{d}+1\right)\left(a+b\log\left(cx^n\right)\right)^2+\frac{2bn(ef-dg)^2\log\ldots}{}\right.$$

$$\frac{(f+gx)^2\left(a+b\log\left(cx^n\right)\right)^3}{2(d+ex)^2(ef-dg)}$$

input
```
Int[((f + g*x)*(a + b*Log[c*x^n])^3)/(d + e*x)^3,x]
```

output
```
-1/2*((f + g*x)^2*(a + b*Log[c*x^n])^3)/((e*f - d*g)*(d + e*x)^2) + (3*b*n
*(-(((e*f - d*g)^2*x*(a + b*Log[c*x^n])^2)/(d^2*e*(d + e*x))) + (f^2*(a +
b*Log[c*x^n])^3)/(3*b*d^2*n) + (2*b*(e*f - d*g)^2*n*(a + b*Log[c*x^n])*Log
[1 + (e*x)/d])/(d^2*e^2) - (f^2/d^2 - g^2/e^2)*(a + b*Log[c*x^n])^2*Log[1
+ (e*x)/d] + (2*b^2*(e*f - d*g)^2*n^2*PolyLog[2, -((e*x)/d)])/(d^2*e^2) -
2*b*(f^2/d^2 - g^2/e^2)*n*(a + b*Log[c*x^n])*PolyLog[2, -((e*x)/d)] + (2*b
^2*(e*f - d*g)*(e*f + d*g)*n^2*PolyLog[3, -((e*x)/d)])/(d^2*e^2)))/(2*(e*f
 - d*g))
```

3.456.3.1 Defintions of rubi rules used

rule 2009
```
Int[u_, x_Symbol] :> Simp[IntSum[u, x], x] /; SumQ[u]
```

rule 2798
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*((d_) + (e_.)*(x_))^(q_)*((
f_) + (g_.)*(x_))^(m_.), x_Symbol] :> Simp[(f + g*x)^(m + 1)*(d + e*x)^(q +
 1)*((a + b*Log[c*x^n])^p/((q + 1)*(e*f - d*g))), x] - Simp[b*n*(p/((q + 1)
*(e*f - d*g)))   Int[(f + g*x)^(m + 1)*(d + e*x)^(q + 1)*((a + b*Log[c*x^n]
)^(p - 1)/x), x], x] /; FreeQ[{a, b, c, d, e, f, g, m, n, q}, x] && NeQ[e*f
 - d*g, 0] && EqQ[m + q + 2, 0] && IGtQ[p, 0] && LtQ[q, -1]
```

rule 2804
```
Int[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))^(p_.)*(RFx_), x_Symbol] :> With[{
u = ExpandIntegrand[(a + b*Log[c*x^n])^p, RFx, x]}, Int[u, x] /; SumQ[u]] /
; FreeQ[{a, b, c, n}, x] && RationalFunctionQ[RFx, x] && IGtQ[p, 0]
```

3.456. $\int \frac{(f+gx)(a+b\log(cx^n))^3}{(d+ex)^3}\,dx$

3.456.4 Maple [C] (warning: unable to verify)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 1.20 (sec) , antiderivative size = 1652, normalized size of antiderivative = 5.60

method	result	size
risch	Expression too large to display	1652

input
```
int((g*x+f)*(a+b*ln(c*x^n))^3/(e*x+d)^3,x,method=_RETURNVERBOSE)
```

output
```
-b^3*ln(x^n)^3*g/e^2/(e*x+d)-1/2*b^3*ln(x^n)^3/e/(e*x+d)^2*f+3*b^3*n^2/e/d
^2*ln(x^n)*ln(e*x+d)*f-3*b^3*n^2/e/d^2*ln(x^n)*ln(x)*f+3*b^3*n^3/e^2/d*ln(
e*x+d)*ln(-e*x/d)*g-3*b^3*n^3/e^2/d*ln(x)*dilog(-e*x/d)*g+3*b^3*n^2/e/d^2*
dilog(-e*x/d)*ln(x^n)*f+3/2*b^3*n^3/e^2/d*ln(x)^2*ln(e*x+d)*g-3/2*b^3*n^2/
e^2/d*ln(x)^2*ln(x^n)*g-3*b^3*n^2/e^2/d*ln(x^n)*ln(e*x+d)*g+3*b^3*n^2/e^2/
d*ln(x^n)*ln(x)*g+1/2*b^3*n^3/e^2/d*ln(x)^3*g-3/2*b^3*n^3/e^2/d*ln(x)^2*g+
3*b^3*n^3/e^2/d*dilog(-e*x/d)*g+3*b^3*n^3/e^2/d*polylog(3,-e*x/d)*g+3*b^3*
n^2/e^2/d*dilog(-e*x/d)*ln(x^n)*g-3*b^3*n^3/e/d^2*ln(e*x+d)*ln(-e*x/d)*f-3
/2*b^3*n^3/e^2/d*ln(x)^2*ln(1+e*x/d)*g-3*b^3*n^3/e^2/d*ln(x)*polylog(2,-e*
x/d)*g-3*b^3*n^3/e/d^2*ln(x)*dilog(-e*x/d)*f+3/2*b^3*n^3/e/d^2*ln(x)^2*ln(
e*x+d)*f-3/2*b^3*n^3/e/d^2*ln(x)^2*ln(1+e*x/d)*f-3*b^3*n^3/e/d^2*ln(x)*pol
ylog(2,-e*x/d)*f-3/2*b^3*n^2/e/d^2*ln(x)^2*ln(x^n)*f+3/2*b^3*n*ln(x^n)^2/e
/d/(e*x+d)*f-3/2*b^3*n*ln(x^n)^2/e^2/d*ln(e*x+d)*g-3/2*b^3*n*ln(x^n)^2/e/d
^2*ln(e*x+d)*f+3/2*b^3*n*ln(x^n)^2/e^2/d*ln(x)*g+3/2*b^3*n*ln(x^n)^2/e/d^2
*ln(x)*f+1/8*(-I*b*Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)
*csgn(I*c*x^n)^2+I*b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3
+2*b*ln(c)+2*a)^3*(-g/e^2/(e*x+d)-1/2*(-d*g+e*f)/e^2/(e*x+d)^2)+3/4*(-I*b*
Pi*csgn(I*c)*csgn(I*x^n)*csgn(I*c*x^n)+I*b*Pi*csgn(I*c)*csgn(I*c*x^n)^2+I*
b*Pi*csgn(I*x^n)*csgn(I*c*x^n)^2-I*b*Pi*csgn(I*c*x^n)^3+2*b*ln(c)+2*a)^2*b
*(-ln(x^n)/e^2/(e*x+d)*g+1/2*ln(x^n)/e^2/(e*x+d)^2*d*g-1/2*ln(x^n)/e/(e...
```

3.456.5 Fricas [F]

$$\int \frac{(f+gx)(a+b\log(cx^n))^3}{(d+ex)^3}\,dx = \int \frac{(gx+f)(b\log(cx^n)+a)^3}{(ex+d)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))^3/(e*x+d)^3,x, algorithm="fricas")
```

output
```
integral((a^3*g*x + a^3*f + (b^3*g*x + b^3*f)*log(c*x^n)^3 + 3*(a*b^2*g*x
+ a*b^2*f)*log(c*x^n)^2 + 3*(a^2*b*g*x + a^2*b*f)*log(c*x^n))/(e^3*x^3 + 3
*d*e^2*x^2 + 3*d^2*e*x + d^3), x)
```

3.456.6 Sympy [F]

$$\int \frac{(f+gx)(a+b\log(cx^n))^3}{(d+ex)^3}\,dx = \int \frac{(a+b\log(cx^n))^3(f+gx)}{(d+ex)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*ln(c*x**n))**3/(e*x+d)**3,x)
```

output
```
Integral((a + b*log(c*x**n))**3*(f + g*x)/(d + e*x)**3, x)
```

3.456.7 Maxima [F]

$$\int \frac{(f+gx)(a+b\log(cx^n))^3}{(d+ex)^3}\,dx = \int \frac{(gx+f)(b\log(cx^n)+a)^3}{(ex+d)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))^3/(e*x+d)^3,x, algorithm="maxima")
```

output
```
3/2*a^2*b*f*n*(1/(d*e^2*x + d^2*e) - log(e*x + d)/(d^2*e) + log(x)/(d^2*e)
) - 3/2*a^2*b*g*n*(1/(e^3*x + d*e^2) + log(e*x + d)/(d*e^2) - log(x)/(d*e^
2)) - 3/2*(2*e*x + d)*a^2*b*g*log(c*x^n)/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) -
 1/2*(2*e*x + d)*a^3*g/(e^4*x^2 + 2*d*e^3*x + d^2*e^2) - 3/2*a^2*b*f*log(c
*x^n)/(e^3*x^2 + 2*d*e^2*x + d^2*e) - 1/2*a^3*f/(e^3*x^2 + 2*d*e^2*x + d^2
*e) - 1/2*(2*b^3*e*g*x + (e*f + d*g)*b^3)*log(x^n)^3/(e^4*x^2 + 2*d*e^3*x
+ d^2*e^2) + integrate(1/2*(2*(b^3*e^2*g*log(c)^3 + 3*a*b^2*e^2*g*log(c)^2
)*x^2 + 3*((d*e*f*n + d^2*g*n)*b^3 + 2*(a*b^2*e^2*g + (e^2*g*n + e^2*g*log
(c))*b^3)*x^2 + (2*a*b^2*e^2*f + (e^2*f*n + 3*d*e*g*n + 2*e^2*f*log(c))*b^
3)*x)*log(x^n)^2 + 2*(b^3*e^2*f*log(c)^3 + 3*a*b^2*e^2*f*log(c)^2)*x + 6*(
(b^3*e^2*g*log(c)^2 + 2*a*b^2*e^2*g*log(c))*x^2 + (b^3*e^2*f*log(c)^2 + 2*
a*b^2*e^2*f*log(c))*x)*log(x^n))/(e^5*x^4 + 3*d*e^4*x^3 + 3*d^2*e^3*x^2 +
d^3*e^2*x), x)
```

3.456.8 Giac [F]

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^3}{(d+ex)^3}\,dx=\int \frac{(gx+f)(b\log\left(cx^n\right)+a)^3}{(ex+d)^3}\,dx$$

input
```
integrate((g*x+f)*(a+b*log(c*x^n))^3/(e*x+d)^3,x, algorithm="giac")
```

output
```
integrate((g*x + f)*(b*log(c*x^n) + a)^3/(e*x + d)^3, x)
```

3.456.9 Mupad [F(-1)]

Timed out.

$$\int \frac{(f+gx)\left(a+b\log\left(cx^n\right)\right)^3}{(d+ex)^3}\,dx=\int \frac{(f+g\,x)\,\left(a+b\,\ln\left(c\,x^n\right)\right)^3}{(d+e\,x)^3}\,dx$$

input
```
int(((f + g*x)*(a + b*log(c*x^n))^3)/(d + e*x)^3,x)
```

output
```
int(((f + g*x)*(a + b*log(c*x^n))^3)/(d + e*x)^3, x)
```

CHAPTER 4

APPENDIX

4.1 Listing of Grading functions

The following are the current version of the grading functions used for grading the quality of the antiderivative with reference to the optimal antiderivative included in the test suite.

There is a version for Maple and for Mathematica/Rubi. There is a version for grading Sympy and version for use with Sagemath.

The following are links to the current source code.

The following are the listings of source code of the grading functions.

4.1.1 Mathematica and Rubi grading function

```
(* Original version thanks to Albert Rich emailed on 03/21/2017 *)
(* ::Package:: *)

(* Nasser: April 7,2022. add second output which gives reason for the grade *)
(*                       Small rewrite of logic in main function to make it*)
(*                       match Maple's logic. No change in functionality otherwise*)

(* ::Subsection:: *)
(*GradeAntiderivative[result,optimal]*)


(* ::Text:: *)
(*If result and optimal are mathematical expressions, *)
(*         GradeAntiderivative[result,optimal] returns*)
```

```
(*  "F" if the result fails to integrate an expression that*)
(*      is integrable*)
(*  "C" if result involves higher level functions than necessary*)
(*  "B" if result is more than twice the size of the optimal*)
(*      antiderivative*)
(*  "A" if result can be considered optimal*)


GradeAntiderivative[result_,optimal_] := Module[{expnResult,expnOptimal,leafCountResult,leafC
    expnResult  = ExpnType[result];
    expnOptimal = ExpnType[optimal];
    leafCountResult = LeafCount[result];
    leafCountOptimal = LeafCount[optimal];

    (*Print["expnResult=",expnResult," expnOptimal=",expnOptimal];*)
    If[expnResult<=expnOptimal,
        If[Not[FreeQ[result,Complex]], (*result contains complex*)
            If[Not[FreeQ[optimal,Complex]], (*optimal contains complex*)
                If[leafCountResult<=2*leafCountOptimal,
                    finalresult={"A"," "}
                    ,(*ELSE*)
                    finalresult={"B","Both result and optimal contain complex but leaf count
                ]
            ,(*ELSE*)
                finalresult={"C","Result contains complex when optimal does not."}
            ]
        ,(*ELSE*)(*result does not contains complex*)
            If[leafCountResult<=2*leafCountOptimal,
                finalresult={"A"," "}
            ,(*ELSE*)
                finalresult={"B","Leaf count is larger than twice the leaf count of optimal. $
              ]
        ]
    ,(*ELSE*) (*expnResult>expnOptimal*)
        If[FreeQ[result,Integrate] && FreeQ[result,Int],
            finalresult={"C","Result contains higher order function than in optimal. Order "<
            ,
            finalresult={"F","Contains unresolved integral."}
        ]
    ];

    finalresult
]
```

```
(* ::Text:: *)
(*The following summarizes the type number assigned an *)
(*expression based on the functions it involves*)
(*1 = rational function*)
(*2 = algebraic function*)
(*3 = elementary function*)
(*4 = special function*)
(*5 = hyperpergeometric function*)
(*6 = appell function*)
(*7 = rootsum function*)
(*8 = integrate function*)
(*9 = unknown function*)


ExpnType[expn_] :=
  If[AtomQ[expn],
    1,
  If[ListQ[expn],
    Max[Map[ExpnType,expn]],
  If[Head[expn]===Power,
    If[IntegerQ[expn[[2]]],
      ExpnType[expn[[1]]],
    If[Head[expn[[2]]]===Rational,
      If[IntegerQ[expn[[1]]] || Head[expn[[1]]]===Rational,
        1,
      Max[ExpnType[expn[[1]]],2]],
    Max[ExpnType[expn[[1]]],ExpnType[expn[[2]]],3]]],
  If[Head[expn]===Plus || Head[expn]===Times,
    Max[ExpnType[First[expn]],ExpnType[Rest[expn]]],
  If[ElementaryFunctionQ[Head[expn]],
    Max[3,ExpnType[expn[[1]]]],
  If[SpecialFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],4]],
  If[HypergeometricFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],5]],
  If[AppellFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],6]],
  If[Head[expn]===RootSum,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
  If[Head[expn]===Integrate || Head[expn]===Int,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],8]],
  9]]]]]]]]]]
```

```
ElementaryFunctionQ[func_] :=
  MemberQ[{
  Exp,Log,
  Sin,Cos,Tan,Cot,Sec,Csc,
  ArcSin,ArcCos,ArcTan,ArcCot,ArcSec,ArcCsc,
  Sinh,Cosh,Tanh,Coth,Sech,Csch,
  ArcSinh,ArcCosh,ArcTanh,ArcCoth,ArcSech,ArcCsch
},func]


SpecialFunctionQ[func_] :=
  MemberQ[{
  Erf, Erfc, Erfi,
  FresnelS, FresnelC,
  ExpIntegralE, ExpIntegralEi, LogIntegral,
  SinIntegral, CosIntegral, SinhIntegral, CoshIntegral,
  Gamma, LogGamma, PolyGamma,
  Zeta, PolyLog, ProductLog,
  EllipticF, EllipticE, EllipticPi
},func]


HypergeometricFunctionQ[func_] :=
  MemberQ[{Hypergeometric1F1,Hypergeometric2F1,HypergeometricPFQ},func]


AppellFunctionQ[func_] :=
  MemberQ[{AppellF1},func]
```

4.1.2 Maple grading function

```
# File: GradeAntiderivative.mpl
# Original version thanks to Albert Rich emailed on 03/21/2017

#Nasser 03/22/2017  Use Maple leaf count instead since buildin
#Nasser 03/23/2017  missing 'ln' for ElementaryFunctionQ added
#Nasser 03/24/2017  corrected the check for complex result
#Nasser 10/27/2017  check for leafsize and do not call ExpnType()
#                   if leaf size is "too large". Set at 500,000
```

```
#Nasser 12/22/2019  Added debug flag, added 'dilog' to special functions
#                   see problem 156, file Apostol_Problems
#Nasser 4/07/2022   add second output which gives reason for the grade

GradeAntiderivative := proc(result,optimal)
local leaf_count_result,
        leaf_count_optimal,
        ExpnType_result,
        ExpnType_optimal,
        debug:=false;

        leaf_count_result:=leafcount(result);
        #do NOT call ExpnType() if leaf size is too large. Recursion problem
        if leaf_count_result > 500000 then
            return "B","result has leaf size over 500,000. Avoiding possible recursion issues
        fi;

        leaf_count_optimal := leafcount(optimal);
        ExpnType_result  := ExpnType(result);
        ExpnType_optimal := ExpnType(optimal);

        if debug then
            print("ExpnType_result",ExpnType_result," ExpnType_optimal=",ExpnType_optimal);
        fi;

# If result and optimal are mathematical expressions,
#  GradeAntiderivative[result,optimal] returns
#   "F" if the result fails to integrate an expression that
#       is integrable
#   "C" if result involves higher level functions than necessary
#   "B" if result is more than twice the size of the optimal
#       antiderivative
#   "A" if result can be considered optimal

    #This check below actually is not needed, since I only
    #call this grading only for passed integrals. i.e. I check
    #for "F" before calling this. But no harm of keeping it here.
    #just in case.


    if not type(result,freeof('int')) then
        return "F","Result contains unresolved integral";
    fi;
```

```
if ExpnType_result<=ExpnType_optimal then
    if debug then
         print("ExpnType_result<=ExpnType_optimal");
    fi;
    if is_contains_complex(result) then
        if is_contains_complex(optimal) then
            if debug then
                    print("both result and optimal complex");
            fi;
            if leaf_count_result<=2*leaf_count_optimal then
                return "A"," ";
            else
               return "B",cat("Both result and optimal contain complex but leaf count of
                                convert(leaf_count_result,string)," vs. $2 (",
                                convert(leaf_count_optimal,string)," ) = ",convert(2*leaf_
            end if
        else #result contains complex but optimal is not
            if debug then
                    print("result contains complex but optimal is not");
            fi;
            return "C","Result contains complex when optimal does not.";
        fi;
    else # result do not contain complex
         # this assumes optimal do not as well. No check is needed here.
        if debug then
               print("result do not contain complex, this assumes optimal do not as well"
        fi;
        if leaf_count_result<=2*leaf_count_optimal then
            if debug then
                print("leaf_count_result<=2*leaf_count_optimal");
            fi;
            return "A"," ";
        else
            if debug then
                print("leaf_count_result>2*leaf_count_optimal");
            fi;
            return "B",cat("Leaf count of result is larger than twice the leaf count of o
                                convert(leaf_count_result,string),"$ vs. $2(",
                                convert(leaf_count_optimal,string),")=",convert(2*leaf_cou
        fi;
    fi;
```

```
    else #ExpnType(result) > ExpnType(optimal)
        if debug then
            print("ExpnType(result) > ExpnType(optimal)");
        fi;
        return "C",cat("Result contains higher order function than in optimal. Order ",
                       convert(ExpnType_result,string)," vs. order ",
                       convert(ExpnType_optimal,string),".");
    fi;

end proc:

#
# is_contains_complex(result)
# takes expressions and returns true if it contains "I" else false
#
#Nasser 032417
is_contains_complex:= proc(expression)
  return (has(expression,I));
end proc:

# The following summarizes the type number assigned an expression
# based on the functions it involves
# 1 = rational function
# 2 = algebraic function
# 3 = elementary function
# 4 = special function
# 5 = hyperpergeometric function
# 6 = appell function
# 7 = rootsum function
# 8 = integrate function
# 9 = unknown function

ExpnType := proc(expn)
  if type(expn,'atomic') then
    1
  elif type(expn,'list') then
    apply(max,map(ExpnType,expn))
  elif type(expn,'sqrt') then
    if type(op(1,expn),'rational') then
       1
    else
       max(2,ExpnType(op(1,expn)))
    end if
```

```
  elif type(expn,'`^`') then
    if type(op(2,expn),'integer') then
      ExpnType(op(1,expn))
    elif type(op(2,expn),'rational') then
      if type(op(1,expn),'rational') then
         1
      else
         max(2,ExpnType(op(1,expn)))
      end if
    else
         max(3,ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    end if
  elif type(expn,'`+`') or type(expn,'`*`') then
    max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
  elif ElementaryFunctionQ(op(0,expn)) then
    max(3,ExpnType(op(1,expn)))
  elif SpecialFunctionQ(op(0,expn)) then
    max(4,apply(max,map(ExpnType,[op(expn)])))
  elif HypergeometricFunctionQ(op(0,expn)) then
    max(5,apply(max,map(ExpnType,[op(expn)])))
  elif AppellFunctionQ(op(0,expn)) then
    max(6,apply(max,map(ExpnType,[op(expn)])))
  elif op(0,expn)='int' then
    max(8,apply(max,map(ExpnType,[op(expn)]))) else
  9
  end if
end proc:


ElementaryFunctionQ := proc(func)
  member(func,[
        exp,log,ln,
        sin,cos,tan,cot,sec,csc,
        arcsin,arccos,arctan,arccot,arcsec,arccsc,
        sinh,cosh,tanh,coth,sech,csch,
        arcsinh,arccosh,arctanh,arccoth,arcsech,arccsch])
end proc:

SpecialFunctionQ := proc(func)
  member(func,[
        erf,erfc,erfi,
        FresnelS,FresnelC,
        Ei,Ei,Li,Si,Ci,Shi,Chi,
```

```
        GAMMA,lnGAMMA,Psi,Zeta,polylog,dilog,LambertW,
        EllipticF,EllipticE,EllipticPi])
end proc:

HypergeometricFunctionQ := proc(func)
  member(func,[Hypergeometric1F1,hypergeom,HypergeometricPFQ])
end proc:

AppellFunctionQ := proc(func)
  member(func,[AppellF1])
end proc:

# u is a sum or product.  rest(u) returns all but the
# first term or factor of u.
rest := proc(u) local v;
  if nops(u)=2 then
     op(2,u)
  else
     apply(op(0,u),op(2..nops(u),u))
  end if
end proc:

#leafcount(u) returns the number of nodes in u.
#Nasser 3/23/17  Replaced by build-in leafCount from package in Maple
leafcount := proc(u)
   MmaTranslator[Mma][LeafCount](u);
end proc:
```

4.1.3 Sympy grading function

```
#Dec 24, 2019. Nasser M. Abbasi:
#              Port of original Maple grading function by
#              Albert Rich to use with Sympy/Python
#Dec 27, 2019  Nasser. Added `RootSum`. See problem 177, Timofeev file
#              added 'exp_polar'
from sympy import *

def leaf_count(expr):
    #sympy do not have leaf count function. This is approximation
    return round(1.7*count_ops(expr))

def is_sqrt(expr):
```

```
    if isinstance(expr,Pow):
        if expr.args[1] == Rational(1,2):
            return True
        else:
            return False
    else:
        return False

def is_elementary_function(func):
    return func in [exp,log,ln,sin,cos,tan,cot,sec,csc,
            asin,acos,atan,acot,asec,acsc,sinh,cosh,tanh,coth,sech,csch,
            asinh,acosh,atanh,acoth,asech,acsch
        ]

def is_special_function(func):
    return func in [ erf,erfc,erfi,
             fresnels,fresnelc,Ei,Ei,Li,Si,Ci,Shi,Chi,
             gamma,loggamma,digamma,zeta,polylog,LambertW,
             elliptic_f,elliptic_e,elliptic_pi,exp_polar
         ]

def is_hypergeometric_function(func):
    return func in [hyper]

def is_appell_function(func):
    return func in [appellf1]

def is_atom(expn):
    try:
        if expn.isAtom or isinstance(expn,int) or isinstance(expn,float):
            return True
        else:
            return False

    except AttributeError as error:
        return False

def expnType(expn):
    debug=False
    if debug:
        print("expn=",expn,"type(expn)=",type(expn))

    if is_atom(expn):
```

```
        return 1
    elif isinstance(expn,list):
        return max(map(expnType, expn))    #apply(max,map(ExpnType,expn))
    elif  is_sqrt(expn):
        if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
            return 1
        else:
            return max(2,expnType(expn.args[0]))   #max(2,ExpnType(op(1,expn)))
    elif isinstance(expn,Pow):    #type(expn,'`^`')
        if isinstance(expn.args[1],Integer):   #type(op(2,expn),'integer')
            return expnType(expn.args[0])    #ExpnType(op(1,expn))
        elif isinstance(expn.args[1],Rational):   #type(op(2,expn),'rational')
            if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
                return 1
            else:
                return max(2,expnType(expn.args[0]))   #max(2,ExpnType(op(1,expn)))
        else:
            return max(3,expnType(expn.args[0]),expnType(expn.args[1])) #max(3,ExpnType(op(1,expn)),ExpnT
    elif isinstance(expn,Add) or isinstance(expn,Mul): #type(expn,'`+`') or type(expn,'`*`')
        m1 = expnType(expn.args[0])
        m2 = expnType(list(expn.args[1:]))
        return max(m1,m2)   #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.func):   #ElementaryFunctionQ(op(0,expn))
        return max(3,expnType(expn.args[0]))   #max(3,ExpnType(op(1,expn)))
    elif is_special_function(expn.func): #SpecialFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(4,m1)    #max(4,apply(max,map(ExpnType,[op(expn)])))
    elif is_hypergeometric_function(expn.func): #HypergeometricFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(5,m1)    #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif is_appell_function(expn.func):
        m1 = max(map(expnType, list(expn.args)))
        return max(6,m1)    #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif isinstance(expn,RootSum):
        m1 = max(map(expnType, list(expn.args))) #Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
        return max(7,m1)
    elif str(expn).find("Integral") != -1:
        m1 = max(map(expnType, list(expn.args)))
        return max(8,m1)    #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9

#main function
```

```
def grade_antiderivative(result,optimal):

    #print ("Enter grade_antiderivative for sagemath")
    #print("Enter grade_antiderivative, result=",result," optimal=",optimal)

    leaf_count_result  = leaf_count(result)
    leaf_count_optimal = leaf_count(optimal)

    #print("leaf_count_result=",leaf_count_result)
    #print("leaf_count_optimal=",leaf_count_optimal)

    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)

    if str(result).find("Integral") != -1:
        grade = "F"
        grade_annotation =""
    else:
        if expnType_result <= expnType_optimal:
            if result.has(I):
                if optimal.has(I): #both result and optimal complex
                    if leaf_count_result <= 2*leaf_count_optimal:
                        grade = "A"
                        grade_annotation =""
                    else:
                        grade = "B"
                        grade_annotation ="Both result and optimal contain complex but leaf count of result is larg
                else: #result contains complex but optimal is not
                    grade = "C"
                    grade_annotation ="Result contains complex when optimal does not."
            else: # result do not contain complex, this assumes optimal do not as well
                if leaf_count_result <= 2*leaf_count_optimal:
                    grade = "A"
                    grade_annotation =""
                else:
                    grade = "B"
                    grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(le
        else:
            grade = "C"
            grade_annotation ="Result contains higher order function than in optimal. Order "+str(ExpnType_


    #print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)
```

```
    return grade, grade_annotation
```

4.1.4 SageMath grading function

```
#Dec 24, 2019. Nasser: Ported original Maple grading function by
#              Albert Rich to use with Sagemath. This is used to
#              grade Fricas, Giac and Maxima results.
#Dec 24, 2019. Nasser: Added 'exp_integral_e' and 'sng', 'sin_integral'
#              'arctan2','floor','abs','log_integral'
#June 4, 2022  Made default grade_annotation "none" instead of "" due
#              issue later when reading the file.
#July 14, 2022. Added ellipticF. This is until they fix sagemath, then remove it.

from sage.all import *
from sage.symbolic.operators import add_vararg, mul_vararg

debug=False;

def tree_size(expr):
    r"""
    Return the tree size of this expression.
    """
    #print("Enter tree_size, expr is ",expr)

    if expr not in SR:
        # deal with lists, tuples, vectors
        return 1 + sum(tree_size(a) for a in expr)
    expr = SR(expr)
    x, aa = expr.operator(), expr.operands()
    if x is None:
        return 1
    else:
        return 1 + sum(tree_size(a) for a in aa)

def is_sqrt(expr):
    if expr.operator() == operator.pow:   #isinstance(expr,Pow):
        if expr.operands()[1]==1/2: #expr.args[1] == Rational(1,2):
            if debug: print ("expr is sqrt")
            return True
        else:
```

```
            return False
    else:
        return False

def is_elementary_function(func):
    #debug=False
    m = func.name() in ['exp','log','ln',
            'sin','cos','tan','cot','sec','csc',
            'arcsin','arccos','arctan','arccot','arcsec','arccsc',
            'sinh','cosh','tanh','coth','sech','csch',
            'arcsinh','arccosh','arctanh','arccoth','arcsech','arccsch','sgn',
        'arctan2','floor','abs'
        ]
    if debug:
        if m:
            print ("func ", func , " is elementary_function")
        else:
            print ("func ", func , " is NOT elementary_function")


    return m

def is_special_function(func):
    #debug=False
    if debug:
        print ("type(func)=", type(func))

    m= func.name() in ['erf','erfc','erfi','fresnel_sin','fresnel_cos','Ei',
          'Ei','Li','Si','sin_integral','Ci','cos_integral','Shi','sinh_integral'
          'Chi','cosh_integral','gamma','log_gamma','psi,zeta',
          'polylog','lambert_w','elliptic_f','elliptic_e','ellipticF',
          'elliptic_pi','exp_integral_e','log_integral']

    if debug:
        print ("m=",m)
        if m:
            print ("func ", func ," is special_function")
        else:
            print ("func ", func ," is NOT special_function")


    return m
```

```
def is_hypergeometric_function(func):
    return func.name() in ['hypergeometric','hypergeometric_M','hypergeometric_U']

def is_appell_function(func):
    return func.name() in ['hypergeometric']   #[appellf1] can't find this in sagemath

def is_atom(expn):

    #debug=False
    if debug:
        print ("Enter is_atom, expn=",expn)

    if not hasattr(expn, 'parent'):
        return False


    #thanks to answer at https://ask.sagemath.org/question/49179/what-is-sagemath-equivalent-to-atomic-
    try:
        if expn.parent() is SR:
            return expn.operator() is None
        if expn.parent() in (ZZ, QQ, AA, QQbar):
            return expn in expn.parent() # Should always return True
        if hasattr(expn.parent(),"base_ring") and hasattr(expn.parent(),"gens"):
            return expn in expn.parent().base_ring() or expn in expn.parent().gens()

        return False

    except AttributeError as error:
        print("Exception,AttributeError in  is_atom")
        print ("cought exception" , type(error).__name__ )
        return False


def expnType(expn):

    if debug:
        print (">>>>>Enter expnType, expn=", expn)
        print (">>>>>is_atom(expn)=", is_atom(expn))

    if is_atom(expn):
        return 1
    elif type(expn)==list:   #isinstance(expn,list):
```

```
        return max(map(expnType, expn))    #apply(max,map(ExpnType,expn))
    elif is_sqrt(expn):
        if type(expn.operands()[0])==Rational: #type(isinstance(expn.args[0],Rational):
            return 1
        else:
            return max(2,expnType(expn.operands()[0]))  #max(2,expnType(expn.args[0]))
    elif expn.operator() == operator.pow:   #isinstance(expn,Pow)
        if type(expn.operands()[1])==Integer:  #isinstance(expn.args[1],Integer)
            return expnType(expn.operands()[0])   #expnType(expn.args[0])
        elif type(expn.operands()[1])==Rational:  #isinstance(expn.args[1],Rational)
            if type(expn.operands()[0])==Rational: #isinstance(expn.args[0],Rational)
                return 1
            else:
                return max(2,expnType(expn.operands()[0]))  #max(2,expnType(expn.args[0]))
        else:
            return max(3,expnType(expn.operands()[0]),expnType(expn.operands()[1])) #max(3,expnType(expn.
    elif expn.operator() == add_vararg or expn.operator() == mul_vararg: #isinstance(expn,Add) or isinst
        m1 = expnType(expn.operands()[0]) #expnType(expn.args[0])
        m2 = expnType(expn.operands()[1:]) #expnType(list(expn.args[1:]))
        return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.operator()):  #is_elementary_function(expn.func)
        return max(3,expnType(expn.operands()[0]))
    elif is_special_function(expn.operator()): #is_special_function(expn.func)
        m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
        return max(4,m1)   #max(4,m1)
    elif is_hypergeometric_function(expn.operator()): #is_hypergeometric_function(expn.func)
        m1 = max(map(expnType, expn.operands()))       #max(map(expnType, list(expn.args)))
        return max(5,m1)   #max(5,m1)
    elif is_appell_function(expn.operator()):
        m1 = max(map(expnType, expn.operands()))       #max(map(expnType, list(expn.args)))
        return max(6,m1)   #max(6,m1)
    elif str(expn).find("Integral") != -1: #this will never happen, since it
            #is checked before calling the grading function that is passed.
            #but kept it here.
        m1 = max(map(expnType, expn.operands()))       #max(map(expnType, list(expn.args)))
        return max(8,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9

#main function
def grade_antiderivative(result,optimal):
```

```
    if debug:
        print ("Enter grade_antiderivative for sagemath")
        print("Enter grade_antiderivative, result=",result)
        print("Enter grade_antiderivative, optimal=",optimal)
        print("type(anti)=",type(result))
        print("type(optimal)=",type(optimal))

    leaf_count_result  = tree_size(result) #leaf_count(result)
    leaf_count_optimal = tree_size(optimal) #leaf_count(optimal)

    #if debug: print ("leaf_count_result=", leaf_count_result, "leaf_count_optimal=",leaf_count_optimal)


    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)

    if debug: print ("expnType_result=", expnType_result, "expnType_optimal=",expnType_optimal)

    if expnType_result <= expnType_optimal:
        if result.has(I):
            if optimal.has(I): #both result and optimal complex
                if leaf_count_result <= 2*leaf_count_optimal:
                    grade = "A"
                    grade_annotation =" "
                else:
                    grade = "B"
                    grade_annotation ="Both result and optimal contain complex but leaf count of result is larger t
            else: #result contains complex but optimal is not
                grade = "C"
                grade_annotation ="Result contains complex when optimal does not."
        else: # result do not contain complex, this assumes optimal do not as well
            if leaf_count_result <= 2*leaf_count_optimal:
                grade = "A"
                grade_annotation =" "
            else:
                grade = "B"
                grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(leaf_
    else:
        grade = "C"
        grade_annotation ="Result contains higher order function than in optimal. Order "+str(expnType_resu


    print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)
```

```
return grade, grade_annotation
```